EMERGENCY PREPAREDNESS COMMUNICATION PATHWAYS WITHIN NEW YORK COUNTIES

A Dissertation

Presented to the faculty of the Graduate School

Of Cornell University

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy

By

Jeffrey Allen Perry

August 2018

EMERGENCY PREPAREDNESS COMMUNICATION PATHWAYS WITHIN NEW YORK COUNTIES

Jeffrey Allen Perry
Cornell University 2018

ABSTRACT

Severe weather and natural or man-made disasters continue to impact every state across the United States and even every nation globally. Emergency preparedness and the ability to respond to and recover from catastrophic events is a critically important element for all communities. There is not a standard response mechanism used nationally despite having the existence of organizations such as FEMA. States vary in the response mechanisms in place, but some communities have set up programs to address catastrophic events. This study focuses on New York counties utilizing emergency coordinators and supporting organizations within governmental agencies and across their communities to establish protocols and ensure action plans are in place. The Local Emergency Planning Committee (LEPC) is one group tasked with information transmission in counties as mandated by the state, but it is not implemented to the same degree in all areas. This study seeks to understand the use of LEPCs in upstate counties (outside New York City and Long Island) to clarify communication mechanisms used and compare with state level data on communication effectiveness in both rural and urban settings. In general, counties rely on the Emergency Management Coordinator to develop sound communication networks to plan for disasters. There is also support for the development of mechanisms to better inform community residents both in planning and implementing recovery efforts after a disaster.

BIOGRAPHICAL SKETCH

Jeffrey grew up with a diverse agricultural background in Central New York and Western Massachusetts. A Bachelor's degree in agricultural education at Cornell followed by a Masters Degree from Virginia Tech in Career and Technical Education launched him into a seventeen year career teaching high school agriculture. He developed his teacher identity in Fauquier County, Virginia at Marshall Jr High for two years then invested the next fifteen years at Letchworth Central School in Wyoming County NY. The program at LCS produced national winners in FFA events, state level awards for students and the program and developed into a strong state program.

In 2008, an opportunity developed at Cornell University with NY FarmNet to assist agriculturalists in farm business planning so Jeff moved to Homer, NY and began a new chapter at Cornell. In 2010 he changed roles and became a lecturer supporting the agricultural education program at Cornell. Jeff has transitioned that program to a collaboration with Ithaca College for teacher certification in agriculture.

The emergency preparedness project has developed one MS degree and a future PhD in climate related issues for Trevor Partridge and afforded Jeff with an opportunity to interact with county coordinators from across the state.

Jeff lives with his wife Rebecca in Homer and their three children are establishing their own professional lives, Allen in Mechanical Engineering, Emaleigh in Horticulture and Evan in Computer Engineering.

Dedication:

Dedicated to my grandparents Lawrence and Helen Perry. Their passion for agriculture and empathy for everyone that crossed their path continues to be an inspiration for my career in education.

Acknowledgements:

I could not have completed this endeavor without the support of my wife, Rebecca. Her patience and editing effort are limitless. She lends an ear for venting and helps keep me on target for my original goal. Dr. Travis Park provided encouragement to start the process. My Dew Crew buddy Glenn Reisweber started me on this journey as we discussed his experience with an emergency response meeting in our home town. My committee members: Dr. John Sipple, Dr. Stephen Hamilton and my good friend Dr. Elizabeth Bihn were willing to share this adventure into emergency preparedness together. Racheal Bothwell was a gifted editor and able to help maintain focus and applicability. Their support, encouragement, and challenging questions aided in the refinement of the original project into what it is today.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Consider the power of nature. Humans work hard to control and monitor our environments; air conditioning in the warm parts of the world and heat in the colder parts. Nature always appears to be one step ahead. Humans worked to manipulate our living space, find good shelter, secure adequate food, and interact with others. As civilizations developed, access to food and a defendable position were critical. That evolved to settlements where water for consumption and power was nearby or transportation lines were developing. Now that the need for defense and immediate proximity to resources is less critical, many humans have shifted their focus for housing. Features including a location with a view, proximity to recreation, or waterfront property are now in demand. Function drives choices less than form or beauty. The preference to live along a coast, ridge, river or stream for beauty or water access can have unintended consequences. Consider the results of a weather front that challenges our living arrangements: hurricane Ike (2008); Katrina (2005); super storm Sandy (2012); Western NY snow storm (2016); Harvey and Irma (2017). Harsh weather has been a part of living in particular areas since the first settlers established a community. Climate scientists hypothesize the frequency and severity of storms is increasing due to elevated greenhouse gas concentrations (Trapp et al., 2007). Sea levels rise at a rate of one-eighth of an inch per year. This increases the frequency of nuisance flooding. Thirty nine percent of the US population lives in counties directly on the shoreline (NOAA, 2017). The demographers state that more people are choosing to live in areas of higher risk (Baker, M., n.d.; Hurricane Sandy Fast Facts,2017; Pignataro, T.J., 2016). Storm surge will continue to increase in severity and cause

disruption of lives. Emergency preparedness will continue to gain in importance as the weather increases in unpredictability. So what is a community to do? Develop emergency preparedness aptitudes across communities.

Today's communities are complex. Our current lives would alter quickly if our roads were closed, power failed, and no cell phone or internet service was available. If we consider an analogy of camping, anyone marching off into the wilderness or onto the ocean without being prepared is condemned as a fool (Flynn, 2016). Being prepared for unknown situations is critical when alone and far from help. When the system complexity increases, being prepared for the unknown is still essential, even if not in a situation of being alone. In past generations, neighbors supported neighbors in times of need. The social fabric of today still has that neighbor to neighbor element, but the technical challenges and complexity of today add to the challenges during moments of crisis. We are more connected by social media, but interact less often with neighbors directly. Dependence upon internet access continues to grow and consider the explosion of cell phone use and potential service disruption compared to land line telephones. State, county and local governments have developed strategies and mechanisms to provide assistance during emergencies. Two questions arise that this research project aims to answer: 1. Do community members understand and have access to the intended assistance before and after an emergency event? 2. Are communication pathways meeting the intended need of having communities ready to respond to crisis?

Definitions

All communities, as defined by being part of a governmental structure, plan a degree of emergency preparation for the time when a disaster impacts the local area. Federal and state grants encourage and assist in disaster planning. Communities vary in the level of investment they choose to select. In some cases, planning may occur after the first disaster, but once a village floods, they will recognize the event and work to minimize the impact of a future event. Natural disasters and extreme events have a broad spectrum of definitions across the globe. For this study, a **disaster** is defined as "the occurrence of severe alteration in the normal functioning of a community due to hazardous physical events interacting with vulnerable social conditions…" (Ranke, 2016). Alternative definitions include the International Federation of Red Cross and Red Crescent Societies that use two perspectives to define a disaster. One format is an equation: (vulnerability + hazard) / capacity = disaster. A more formal statement, "A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources; a community's vulnerability added to the hazard, divided by its capacity to respond equals disaster." Disasters can be of natural or human origins (What is a disaster?, n.d.). **Hazards**, both technological and natural, are forces that can cause the floods, storms, chemical spills, etc. that may develop into a disaster if a community is vulnerable to the hazard impact (Zakour & Gillespie,2013). The state of New York has a broad range of topography, from lake shores to ocean beaches to large stretches of forest and open fields. All of these experience a mix of weather events including severe rain, severe snow, and high winds. The definition of disaster noted above is sufficiently

broad to encompass the multiple types of events that may occur across the state. The hazards are focal points for communities to develop plans to react to and minimize how often the event results in a disaster declaration.

Resistance applies resources towards keeping danger or disaster away. **Resilience** uses resources to bounce back (recover) after the disaster event occurs (Longstaff, 2005). **Private resources**, refers to the equipment, labor and supplies owned by local citizens or businesses that have potential use in the case of a disaster response. This does not include town, village, county or state agency resources. **Transient dysfunction** is a temporary breakdown in services and normal operating state followed by a return to functioning across the community (Norris et al., 2008).

Emergency Preparedness

The State of New York's Department of Homeland Security mandates a specific level of emergency planning for every county against an array of potential threats. The mandate predates the establishment of the Department of Homeland Security (NYS Executive Law Article 2-B, 1978). Counties report basic preparedness data to the state and federal levels, yet not all communities display the same degree of preparedness for the stress of severe weather events specifically (NYS Homeland Security, personal communication, January 20, 2015). State Homeland Security staff noted a potential difference in characteristics between communities that are well prepared from those underprepared. Communication and differences in perspective between rural or urban communities are both of interest in relation to the current study.

Impetus for the Study

From September 2011 through November 2012, New York experienced five significant weather-related catastrophes: Hurricanes Irene (2011) and Sandy (2012), Tropical Storm Lee (2011), a severe drought (2011-2012), and the combination of early and extreme spring warmth followed by late extreme cold resulting in bud freeze and crop loss (2012). The extreme weather motivated a study by the New York State Economic Development Corporation regarding agriculture producer resilience (Perry & Partridge, 2015). The study found that two topics surfaced across both the producer and non-producer focus groups. Identifying resource needs and communication regarding emergency actions during and after the weather event were lacking. There are resources available at the federal, state and local levels identified via FEMA, New York State Emergency Management Operations and County-level Emergency Coordinators (Bucci et al., 2013). However, awareness of the resources was limited in the larger rural community represented by the focus groups of the resilience study. State mandated reporting for emergency preparedness is captured through the County Emergency Preparedness Assessment (CEPA) tool. All counties report access and use of a Local Emergency Planning Committee (LEPC). However, in discussing the data with state homeland security staff, there was anecdotal evidence that all counties did not utilize the LEPC's equally even with a state mandate for its use (NYS Homeland Security, personal communication, January 20, 2015).

Two local events added encouragement to pursue the project. A large local dairy producer was piloting interview questions for me. We were talking about resource use and he relayed a story from several years ago when he needed to plow his county road with farm equipment to open it up for the milk pick-up. He mentioned it to the town supervisor after the

fact and in today's business climate that is no longer done due to liability. But the milk truck still has to have access. A colleague attended a public emergency planning meeting and requested a phone number to use as a resource to review the emergency plan for his area. The question was not answered directly by any of the emergency management staff on hand. The experiences of community members increased my awareness of the direct impact emergency preparedness can have on individuals, and yet, I was unaware of the infrastructure in place to provide support in the event of a disaster. This lack of knowledge encouraged my interest in uncovering more details that resulted in the Ag Resiliency study (Perry & Partridge, 2015) and the current project. The current study seeks to understand the variations in involvement and commitment at the county level and consideration of differentiation by rural or urban settings.

Establishment of the Local Emergency Planning Committees (LEPC)

The use of LEPCs was initiated as part of Title III of the Superfund Amendments and Reauthorization Act (SARA) passed in 1986. This was due to the loss of 2000 lives from an accidental chemical release in Bhopal, India. LEPCs were designed to be a forum for first responders and began to be implemented after the SARA act with the Environmental Protection Agency (EPA) surveying compliance in 1994 and 1999. In 2008 a comprehensive survey was initiated nationally to determine the progress of LEPCs in working with local citizen communication, proactive accident prevention efforts, and the effectiveness of products and services provided by the Office of Emergency Management at the national level. This survey was also deemed important due to the events of September 11, 2001 and the change in data available for community emergency planning in subsequent years.

Study Parameters of Focus

The intent of this study is to distinguish the variations in communication pathways starting with the Local Emergency Planning Committees (LEPC) structure and considering county emergency plans; interactions with agencies in an emergency; county animal response teams; and interactions with NY EDEN (Emergency Disaster Education Network). The goal is to better understand how county emergency management staff interact with community entities for emergency planning. LEPC and County Emergency Coordinators are intended to act as a conduit for local response planning. Although New York State mandates that each county establish an LEPC, preliminary evidence suggests a high degree of variance in actual involvement of the committees (NYS Homeland Security, personal communication, January 20, 2015).

Researcher's Perspective

This research project is based on a pragmatist standpoint of methodological appropriateness: developing a mixed method approach that aims at answering the questions posed without limiting methodology to one orthodox form or another (Patton, 2002). I engage more often with qualitative operations but can appreciate quantitative procedures and their detailed results as well. Emergency preparedness, by nature of its practical application, lends itself towards a pragmatic approach. The topic is at the intersection of individuals, communities, governments, and events beyond our control. Interactions between the self and people, objects and events determine reality (Lindlof & Taylor, 2002, p. 41). Interactions between our environment and people we work with are critical to the framework of

understanding reality that we use every day**.** This pragmatist paradigm asserts itself between the constructivist (naturalist) paradigm that all explanations of events are socially constructed and the suggestion that there are objective, "natural laws" as suggested in the positivist (scientific) paradigm (Guba & Lincoln, 1989). Pragmatism builds off of an indeterminate reality constructed as we interact with and learn about the environment and individuals around us (Lindlof and Taylor, 2002, p41). The cause and effect perspective of positivist frameworks is problematic in the current study's line of inquiry as the interactions are not linear, increasing the complexity factors to be considered.

All methods of research are imperfect, so multiple methods strengthen the breadth of our understanding over time. I have a desire to identify an issue and work towards uncovering information that can have an impact on a solution to the issue at hand. My experience as a high school teacher where "real and relevant" were daily mantras that continue to influence my philosophical standpoint today. If I consider a theoretical foundation on which to build my research, I lean toward the **systems theory** perspective as described in Gharajedaghi (2011). Classical science works within analytical thinking to focus on independent variables. The whole is observed to be more than the sum of its parts. Holistic, or systems thinking, considers the interdependence of more complex systems. Weather is one of those very complex systems with interdependent variables. An emergency response system is also very interdependent as it is a large, complex system across multiple layers of effort. A traditional system of independent variables is typically controlled with an intent to limit change. In emergency preparedness, change is common and the ability to respond and interact is essential (Gharajedaghi, 2011). The concept of considering an entire system, without necessarily taking

it apart, allows for data collection across a range of events rather than looking at the response to one specific type of event. A clearer perspective of the system is the result. The option to use analytic induction by studying specific cases in-depth, in series would provide a wealth of information. However, the time-frame for the data to be collected and interest in representing the entire upstate NY region cause me to set that option aside (Patton, 2002). Systems theory builds upon assumptions linked to chaos theory.

The weather-related connection to the initiation of **chaos theory** as described in Gleick (1987) adds a twist to this research as the extreme events may cause chaos and not follow a known pattern and yet have a consistency within their occurrence that Lorenz had discovered in 1960 with a relatively basic weather toy. This developed into the "butterfly effect", the impact of small variations that prevent aperiodic systems from ever repeating themselves. Weather is an example of such a system, although not the only one. This discovery evolved into the study of chaos theory (Gleick, 1987 pg. 23). The current study is working to capture upstate New York's efforts to react to the ever-changing weather that may be influenced by the butterfly effect and climate change. While chaos may be present in the weather-related issues impacting this study, the patterns being considered in this research project are narrower than those chaos theory works to understand.

Chaos theory gathers scientific disciplines to work at understanding patterns that develop on different scales at different times (Gleick, 1987 pg. 5). Physicists and biologists begin to focus on the natural systems and intersect in calculations and discussions that were not traditionally considered. Systems theory arguably takes the next step: utilizing analytical science and incorporating sociocultural systems into the discovery process (Gharajedaghi, 2011

pg. 87). Systems theory interacts across macro and micro scales. Analytical processes are utilized while embracing the randomization described in chaos theory. Quantitative analysis is as comfortable in this work as are qualitative studies. My personal pragmatic tendencies appreciate the ability to use multiple tools and perspectives to consider a particular phenomenon. The interaction of multiple individuals and organizations as they are impacted by the aperiodic weather systems fits within the openness principle of systems theory as well. There are elements within the system that can be influenced and create a shift that can produce desired results from the perspective of the people in the system under review (Gharajedaghi, 2011).

Design of the Study

This study utilizes mixed methods, building from analysis of trend data from the New York State Office of Emergency Management within the Division of Homeland Security and emergency services. A semi-structured interview is utilized to gather information from upstate community emergency coordinators to ascertain the level of performance regime established in each area and the level of engagement from the LEPC in the regime. The study is exploratory by design with the intent of determining what variations there are, if any, in the use of LEPC or other organizational structures to facilitate emergency preparedness in counties across upstate New York.

Basis for Methodology

The naturalistic design strategy used in this research is informed by Lincoln and Guba (1985) and Patton (2002). 1. The naturalistic setting – interview and state level data are directly from

the New York counties identified, and persons of interest in each county. This is a discovery-oriented study with guiding parameters, but no specific theory to test. 2. Open-ended response format to the interviews allow for a broader response to initial questions. This increases complexity of responses, but may in turn, offer more detailed insight into particular issues for a given community. 3. Purposeful sampling was utilized. The county level emergency planning coordinator is at the intersection of many community organizations and their involvement with performance regimes. The differences or similarities at this juncture are of interest in trying to determine the range of implementation and impact of LEPCs across counties with varying demographic data. The state office of homeland security expects a baseline of county implementation (NYS Homeland Security, personal communication, January 20, 2015), yet data demonstrates variation in the interpretation of expectations. 4. Qualitative vs quantitative data collection -- quantitative data is useful in broad spectrum analysis and when data tools provide clear, finite information to work with. This research includes trend analysis of state level data collected for each county's emergency planning procedures. The data collection using qualitative surveys further refines the knowledge available by communicating directly with personnel, and being able to ask specific, follow-up questions with the intent of developing a clear understanding of how the LEPC is designed and utilized in each county. This data can then be compiled and compared with the agriculture resiliency data to look for strengths and weaknesses in the implemented emergency plans, and their relationship with rural counties in New York State.

A study by Bowman and Parsons (2009) delved into emergency planning development across five counties within one state. The study considered risk, vulnerability and resilience,

and the level of preparedness at the local level to mitigate the vulnerability and, by doing so, increase resilience in the community. Local governments display a range of resource levels and degrees of preparedness. The study identified performance regimes as introduced by Clark and Chenoweth (2006) as an organizational tool to improve preparedness. My research intends to further develop the Local Emergency Planning Committee as a mechanism to improve performance regimes and thereby increasing community emergency preparedness. A related question to the preparedness level of a community is how widespread the preparedness is observed beyond the local government agencies that have preparedness as part of their mission. This study will move beyond the Bowman and Parsons study by identifying trends in the county level data and comparing those with trends at the state level in an effort to increase reliability and to strengthen the clarity of the state level summaries.

Framework for Research

This research builds upon a model put forth by Norris et al. (2008) regarding stress resistance and resilience over time (Figure 1.) The research in this paper specifically focuses on resource mobilization to a crisis to minimize the dysfunction. The model does include several terms that need defining. To begin, the model in Figure 1 uses the following definition of **disaster:** "a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance (Norris et al., 2008 p. 130). "The primary point is that resilience does not preclude dysfunction or distress. It is now commonly accepted that some distress is a normal reaction to an abnormal event. The dysfunction or distress is transient, followed by a return to functioning" (Norris et al., 2008 p. 132). **Persistent dysfunction** is a lack of return to functioning.

Figure 1, below, provides a model of overall community planning for a disaster event. Pre-event planning may occur that provides a degree of resistance (ability to absorb the event impact) to a disaster event. Resistance involves resources that keep danger away as compared to resilience which uses resources to bounce back after bad things happen (Longstaff, 2005). An event (stressor), can vary in severity, duration, and surprise such that a plan may not prepare the area to react successfully each time. If the event is strong enough to cause stress on a community, it will trigger the mobilization of resources to respond to the event and avoid a crisis. A crisis may be brief due to planning and resources such that the community resists and returns to the level of functioning that existed prior to the event. If the stressor is too strong for the resistance, the crisis is elongated and the community resources fail to meet the demands of the new stress, developing into crisis areas. At this stage, a community needs to adapt and engage resources to solve problems and stabilize the community food systems, infrastructure, power, governmental systems and communications. Successful adaptation of resources and communication will enhance resilience and the community will move forward with new information and develop plans including the new event knowledge (Norris et al, 2008). Failure to adapt and move forward results in persistent dysfunction and inability to return to functioning. There are communities in New Orleans that took years to recover from Hurricane Katrina. The model identifies vulnerability as a factor leading towards persistent dysfunction. Vulnerability as a concept was introduced as a response to strictly hazard-oriented risk perception in the 1970s (Lucini, 2008). **Vulnerability** is "the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard" (Wisner et al 2004).

The current study proposes to add the lower elements boxed in the model below to further clarify the "resource mobilization" of the original model. Each county has an Emergency Management Coordinator (EMC) that is expected to utilize a Local Emergency Planning Committee (LEPC) as mandated at the State and Federal level, as a mechanism to facilitate mobilization and communication across resources. This is an attempt to build resistance and resilience to disaster events. The mandate is not funded, leading many LEPC's to be staffed primarily by volunteers and community organizations (Whitney and Lindell, 2000).

Purpose and Objectives

Emergency preparedness is an area of continued growth and development across the country. The profession is becoming more structured with career-oriented individuals rather than utilizing retired fire and police professionals to fill critical roles (Hastings, 2017). This study will help to increase awareness of the variations in interpreting state guidelines for the use of LEPCs as a tool for community networking and communication.

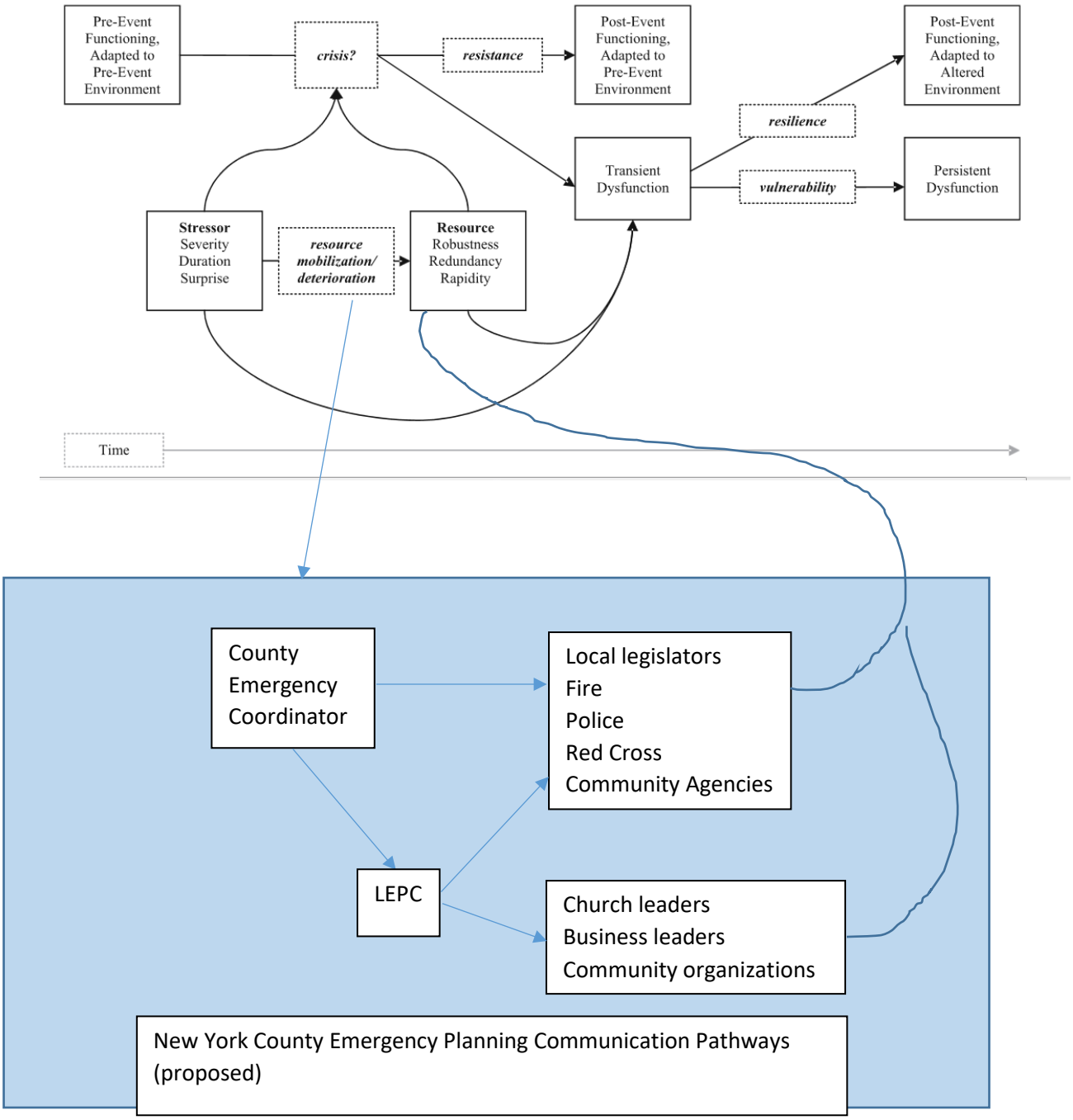
The **research objective** that guides this study centers upon learning what the communication network for upstate NY counties includes that enables effective emergency responses to potential disasters.

The specific hypotheses for this research include:

1. H1: There is a spectrum of involvement and commitment levels by county LEPC's to assist in emergency planning.

2. H2: Rural communities demonstrate more direct use of LEPC's in emergency planning than urban and suburban counties.

Figure 1. Stress resistance and resiliency over time. Norris et al. (2008) with proposed addition.



Professional Significance of the Study

The data collected and analyzed in this study includes a trend comparison of this county-based data collection and the data collected at the state level. The discussion between the state representative and myself shed light on discrepancies in the state data collection tool, or the way counties are reporting the data. This research will aid the counties and the state department of homeland security to more clearly communicate needs and responses to each other by becoming aware of variations in interpretation or delivery mechanisms. The additional detail to the model of resistance and resilience by Norris et al. (2008) may be applicable to counties across the country as they work to refine their emergency planning and communication structures to adapt to new threats.

Study Parameters

County level emergency preparedness is a complex and multilayered process that can vary in approach and results as one moves from county to county across the state and even more state to state. The communication network across upstate NY counties is the intended target of the study, the parameters of the data collection include:

1. Upstate New York Counties only – (above Orange and Duchess counties)
2. Emergency management coordinator (EMC) or LEPC Chairperson as point of contact
3. Community members from rural areas contacted for emergency plan awareness.

Defining elements of the study are as follows:

1. Small sample population number – while 51 upstate counties were included in the target, only 24 responded to the prompts for participation. A 49% response rate for a

survey is acceptable, the limited (N) does decrease the power of the analysis and the degree it can be applied to exterior populations.

2. Survey design – the survey tool was adapted from Bowman and Parsons (2009) and piloted through interaction with a County Emergency Coordinator office that helped refine questions based on intent and knowledge of their fellow counties. The community survey questions closely aligned with questions for the EMCs and were piloted with a small group of progressive producers. Additional iterations of both pilot efforts may have further refined the questions if time had allowed. The interviews have been transcribed and coded into categorical values for statistical analysis. In several cases, the questions were open-ended and responses were coded as described in chapter four.
3. The community response to requests for interviews regarding emergency preparedness was quite small. The responses collected can be used to compare with responses from the Emergency Management Coordinators (EMCs) but statistical analysis is limited due to such a small sample number. This could be an area of further study with a focus more on community input and response rather than the LEPC and EMCs.

Summary of Study Perspective:

This research builds upon the Agriculture Resilience Study, (Perry and Partridge, 2015), (Partridge & Perry, 2016) where focus groups in five rural regions at high risk of severe weather and economic stress captured examples of strength and areas of need in relation to local, county, and state communication and planning. Resource availability and emergency

communication emerged as the two areas of strong need in that study. County-wide communication networks between emergency agencies were categorized as strong; however, information dissemination to community members was found in need of improvement (Partridge, T. & Perry J., 2016). What effect does the LEPC have on access to that communication network? Before data is considered to answer that question, Chapter Two will review the literature regarding emergency preparedness and consider how the LEPC fits into the overarching emergency response picture, and the underlying communication needs of emergency management and fire services in each county. Emergency planning at the county level incorporates three focal points that existing research provides supporting evidence for: resilience, command function, and communicating with the public. The EMC for each county balances all three aspects within their daily duties and reporting. This study will use current literature to illuminate the three areas and position this research within supportive literature such that the new information gathered will add to the body of work. Chapter Three provides details about the current study, its planning and implementation, and design aspects considered during development. Data collection procedures and organization will provide clarity regarding the results presented in Chapter Four. Chapter Four will present the results of the interviews in a format that aligns with the study's research questions. Chapter Five will analyze the data collected and use the conclusions to suggest changes or clarification to the proposed addition to the Norris model.

CHAPTER 2

REVIEW AND SYNTHESIS OF THE LITERATURE

The issues of emergency preparedness are supported by a substantial body of research literature. The three areas of research relevant to this study are resilience, command function, and communication with the public.

Resilience

Resilience is the overarching concept that emergency preparedness is working to achieve. Resilience, for this research, refers to a community's ability to "prepare and plan for, absorb, and recover from, and more successfully adapt to adverse events" (National Academy of Sciences, 2012; Kahan et al, 2011). Kahan also clarifies the spectrum of hard and soft infrastructure systems that are expected to be resilient. Hard resilience includes infrastructure and institutions, many of the physical elements people interact with each day. The soft resilience is personal in nature: family, community, and society focus on human needs, and relationships. Both are critical in the long-term success regardless of community or country. (Kahan et al, 2011). The resilience is impacted directly by emergency preparedness and communication within the community (Meyer-Emerick, 2016).

A disaster, or unplanned event, impacts individuals and communities in a variety of ways, and usually not for the better. Resistance is a measure of the force required to displace the system from equilibrium. A community with resources on hand and strategies to handle possible stressors is resistant to an event causing major changes on its infrastructure. If the event overwhelms the planning and pushes the community into crisis, resilience enters into the

picture as it is a measure of how the community can recover and reset to a normal operational condition following the event. The primary point of resilience is not if a community recovers, but the speed in which equilibrium is returned (Norris, Stevens, Pfefferbaum, Wyche, Pfefferbaum, 2008). If we consider the recovery from Hurricane Katrina, there are parts of New Orleans that have still not recovered. The estimated reconstruction period of 11.5 years has been reached and areas remain in a state of upheaval. One element of recovery may include families and businesses leaving the area and establishing a home away from New Orleans. This move can have an impact upon the new community persona in the aftermath of the storm (Cutter et al., 2006). Community preparedness is relevant to a broader audience due to the potential for permanent relocation from areas deemed a high risk or where recovery will take an extended time period. The resilience to absorb such an event was not present in New Orleans, even though recovery was initiated and is ongoing. A similar example can be found in Haiti following the earthquake of 2010. The earthquake overwhelmed community systems partially due to poor planning and construction. Recovery will take years and millions of dollars (Bilham, 2010). Proper planning is critical to resilience, but it is also important to acknowledge that it impacts the survival of people, their future productivity, and it impacts the economy of not only the area impacted but of the entire country as resources are committed to address a lack of resiliency.

A study by Norris et al. (2008) resulted in a model (Figure 1, pg.15) that attempts to explain how resilience can work to minimize dysfunction and get to a new level of stability. The study pursues the path of health and mental health related issues, not the organizational behavior and disaster management path. However, the two paths do inform each other and

the model is useful for considering the structure that influences decisions and design from emergency planning personnel. There are aspects lacking when discussing the relationship of the LEPC to resilience. The model, as viewed in Figure 1 (pg. 15), begins with a stressor, the disaster event. This is posed as a crisis to be considered given current planning for such an event. The planning would allow for a degree of resistance, where the stress of a community is not heavily affected and functionality is impacted to varying degrees. The amount of deviation from normal activity is captured by the term "transient dysfunction". This dysfunction, or confusion, will not be long lasting if resources are available to combat the stressor and return towards a normal state of operation. The stressors at this stage are impacted by the resources available to handle new events through resource robustness, redundancy, and speed of implementation. This step is where emergency planning and communication positively impacts the model. Within the "resource mobilization/deterioration" aspect of the model, communication and planning strategies as they relate to resource use and informing the public, directly impact the speed of overcoming transient dysfunction and a return to a level of "normal". A plan in place and implemented will increase resilience allowing for faster adaptation to the unfolding circumstances following a disaster. If a flood washes out a bridge, the speed at which a community adjusts operations to compensate is a concrete example of resilience. An issue to further compound the problem of transient dysfunction is the choice to repair the bridge quickly for short term use, or consider the reasons for failure and change the design, investing more time and money, such that the bridge is less likely to flood in the future. There are several perspectives of how to measure both the resilience and the emergency preparedness of a community, the following studies consider tools available for use in research.

Cutter, Burton and Emrich (2010) utilized composite data representing social, economic, natural hazards, infrastructure, and community capital resilience. Fifty variables were originally collected and reduced to thirty-six in the final analysis. Variable categories included: social resilience; economic resilience; institutional resilience; infrastructure resilience; and community capital. Each sub-component contained seven to eight variables. All data were generated from publically available data sources. The results provided resilience scores for 736 counties across the southeastern United States. Urban areas were found to be more resilient than rural areas. The pattern did change when experience with disasters, insurance, and participation in Storm Ready programs were considered. Florida, for example, displayed a much broader aspect rated highly resilient, including rural areas, given their exposure to increased storm frequency.

A different approach is taken in research by Aldunce, Beilin, Handmer, and Howden (2014). The study utilizes observations, document analysis and personal interviews to develop three storylines related to resilience and disaster risk management in Australia. Respondents aligned with a mechanistic/technocratic perspective, community based perspective, or sustainability perspective. The results focus on the need for preparation in addition to response and recovery. A model of bouncing back where resiliency generates a new level of preparedness and the recovery does not return to the original state of affairs develops. The recent disaster informs the recovery process and changes the community perspective. Hence, the community is more prepared for the next event. Conclusions included the need to focus on preparedness rather than response and recovery, and that the concept of "bouncing back" to where a community was prior to the event is a narrow definition and needs to be broadened to allow for more variation. The final conclusion built upon the divergent storylines and the

benefits observed within all three perspectives. Strength of resilience was found in communities that could react to stressors in approaches unique to their circumstances rather than have an expectation that all respond to an event in a similar manner. The primary area of convergence for the three storylines was a need for planning and resource development rather than an emphasis on immediate response to an event. Beyond that, each of the perspectives had unique mechanisms for establishing resilience that were based upon specific needs and perspectives of each community. The underlying need for planning was consistent but implementation varied. A similar perspective has been put forth in regards to the current study.

Resilience as a concept stems from an ecological history. One study by Carpenter, Walker, Anderies and Abel (2001) applied resilience as a model with measurable changes in two lake ecosystems. In their study, the lakes are not in a steady state of clarity and resilience. The lake may be adjusting its reference point as to what is "normal" as the life cycle carries on. That concept can be applied to the community model where a steady state of development and growth is not a typical situation. Gunderson (2000) labels this resilience and multiple equilibrium. Carpenter et al. (2001) also point out the challenges with measuring and even identifying indicators of resilience. Determining resilience is very dependent on specifying the time scale of the measurement. A time horizon of decades may produce very different results for the same area than using millennia as a scale. A second confounding issue noted by Carpenter, and reported by Gunderson and Holling (2002), is the adaptive cycle theory. The theory states that dynamic systems such as ecosystems, societies, corporations, and nations do not exist in a stable state. Four phases are cycled through: rapid growth and exploitation (r),

conservation (K), collapse (Ω), and renewal (α). It is noted that this theory is not a testable hypothesis but more of a metaphor for human interactions. The concept generates testable explanations as situations are compared to the adaptive cycle theory. Emergency preparedness and community resilience is certainly an ever-changing landscape onto which adaptive cycle theory may generate new models of testing and analysis. Given this theory to build off of, Carpenter et al. (2001 p. 766) put forth three properties of resilience: a. the amount of change a system can undergo and remain in control; b. the degree to which the system can self-organize or be organized by external factors; c. the degree to which the system can build capacity to learn and adapt. These three properties relate to the model Norris et al. (2008) put forth, which is used as a basis for the current research (Figure 1). Pressure to change is in the form of a crisis. The community absorbs some of that via resistance, but may need to engage resources as it is overwhelmed and moves to transient dysfunction. The ability to organize occurs as resources are mobilized and resilience is observed to stabilize the community and avoid persistent dysfunction. The ability to learn and adapt will encourage a faster recovery from the next crisis that develops. The proposals put forth by Carpenter et al., (2001) help interpret reactions to a crisis event, however, the study details challenges in measurement of data using an ecosystem example. The transfer from lake resilience to community resilience and the measurements desired is quite a leap. Community dynamics and variability create a challenging environment in which to capture data.

A study by Djalante and Thomalla (2011) reviewed definitions and operational frameworks for community resilience to natural hazards and climate change. The primary term emphasized for the study is Disaster Risk Reduction (DRR). Under the DDR umbrella they do

note a range of interpretations of defining resilience. From Timmerman's (1981) "the capacity of a system to absorb and recover from the occurrence of a hazardous event" to four other authors who pushed against Timmerman's idea as more resistance than resilience, and defined resilience by bouncing back, mitigating and recovering from disasters. Wildavsky (1991) takes the definition one step farther and finds common characteristics of a resilient system to include redundancy, diversity, efficiency, autonomy, strength, interdependence, adaptability and collaboration. The study also compiled a meta-analysis of twelve frameworks utilized to explain procedures to achieve resilience but no consensus on procedural steps was found in the study. Four of the models did specify an expected result of resilience and the ability of a community to bounce back after a disaster and adapt to adversities such that outcomes are better than before. One more distinction made is resilience as an outcome versus a process. Cutter et al. (2006) use resilience as an outcome – the ability to bounce-back or cope after a disaster including a quick recovery. Resilience is a process if defined as an ability to learn and mitigate future disasters (Djalante and Thomalla, 2011).

Stemming from research in rural towns across Australia, McManus et al. (2012) find that resilience starts with local leadership and social capital in communities, but requires additional social and environmental dimensions such as population dispersion, access to jobs, housing, and health care, that are less well understood. A dynamic blending of factors to develop the type of resilience a community would be striving for is optimal. Building off of the local leadership needs, Geis (2000) stipulates that a disaster-resistant community (DRC) is the safest community we can design and build into a natural hazard context. The DRC is developed at the local level based upon national or regional guidelines for hazard-prone areas. In this case, the

community is designed to be resistant to a severe event such that the event does not turn into a disaster. Aspects including building codes, community infrastructure plans, public transportation, water treatment, and utilities are incorporated while developing emergency management plans in a manner that will repel potential damage from weather. This decreases the economic and human losses, but requires forethought and planning across all community sectors. Geis (2000) was prescriptive in his discussion; however, data was not provided to support his claim of less losses given such a planning project.

Kulig, Edge, Townshend, Lightfoot, and Reimer (2013) note data collection challenges and provide a review of four models in the literature. The authors note a persistent issue in the literature of struggling to quantify measures of resilience as compared to the contributing factors that impact resilience. The four models reviewed include: the Community and Regional Resiliency Initiative (CARRI) and the Disaster Resilience of Place (DROP) both by Cutter et al. 2008. There are also the Community Resiliency Scale (CRS) and Index of Perceived Community Resilience (IPCR) both by Kulig et al. (2008). The CARRI model describes the relationships among resilience, social and built environments, and natural systems and their vulnerabilities (Cutter et al., 2008a). The model defines resilience as dynamic and yet treats it as a static entity in order to measure it. Four elements: social vulnerability, built environment/infrastructure, natural systems, and hazard mitigation/planning are the basis for the model. Each aspect is measured by specific indicators such as age, gender, socioeconomic status, etc. The model does link vulnerability and resilience in communities. The second model is the DROP model that focuses on social resilience and vulnerability within a disaster context (Cutter et al., 2008). The existing conditions interact with the natural hazard characteristics (frequency, duration,

intensity) and depending on the community reaction, can generate a positive or negative response to the hazard. The key piece from this model is the feedback loop that encourages learning from each event so the preparation has moved forward and been refined before the next event. An important point to understand when defining resilience and how it is measured is that many of the tools used to measure are perceptions about resilience. During an event, measurements are not feasible so data is collected after an event or before an event.

Related to that purpose, the Community Resilience scale (CRS) (Kulig et al., 2011), used a 15 item, 5 point scale developed from community members' perceptions of resilience-related items. The study population (n = 210) came from communities evacuated because of wildfires. The team revised the original scale and decreased it to 11 items due to items that were found to be too specific or tangential to the resilience concept. The new scale was labeled the Index of Perceived Community Resilience (IPCR).

Each of these models has documentation and studies implemented in support of them; they use an indexed format similar to Cutter, Burton and Emrich (2010) discussed above. Each utilized a unique blend of factors and scales all working with community-oriented resilience and the social, economic and natural systems present in each particular study site. Kulig et al. (2011) note that continued efforts to validate the models presented and to determine which indicators are strong measures of determining resilience are left to future research.

While indexed models can provide a score to compare communities one to another, the study for this paper is working to identify shortcomings within the community network so that resources, or efforts, can be directed to strengthen community responses to a crisis event.

Resilience is the end goal. A study that aligns closely is that of Bowman and Parsons, *Vulnerability and Resilience in Local Government: Assessing the Strength of Performance Regimes* (2009). They note that Wise (2006) advocates a format of adaptive management whereby communities develop interagency networks both within and across jurisdictions. The intent is to be able to solve problems and react to new information more effectively. An additional item of interest is that the growth of these networks is more common in populations over 100,000 as compared to areas with less than 10,000 residents. That does leave a large, undiscussed range in the middle. Additional research is called for to explore the degree to which collaboration has taken root in communities (Bowman and Parsons, 2009). A concept brought forth in their study is one of local performance regimes. A local performance regime includes local governments mobilizing public and private sector partners in established procedures or pathways in the event of a crisis. This may be through memoranda of understanding (MOUs) or involvement in community planning. In the current study, this could be achieved through the LEPC or related committee. Clarke and Chenoweth's (2006) study argues for performance regimes as a viable strategy for local governments to interact with risk, vulnerability and resilience. A performance regime is identified as a long-standing relationship between governmental and non-governmental organizations including a common understanding of a particular problem. The relationship and partners maintain a long-term view on a central concern that impacts more than one of the partners. The performance regime must overcome three challenges to maintain cohesion: overcome asymmetrical incentives and encourage a diverse range of stakeholders; persuade participants to sustain involvement over a long period of time; overcome a collective action problem (short-term

solution) to create a durable coalition around performance goals to reduce local vulnerability (Clark and Chenoweth, 2005).

Deficiencies in the studies:

While the concept of an overall indicator of resilience applied to counties across a region would be desired, there are questions regarding the validity of the public data in its use aligning it to represent a degree of community resilience across the five sub-categories: social resilience; economic resilience; institutional resilience; infrastructure resilience; and community capital. The results in Cutter et al. (2010) highlight the strong resilience of urban areas across the state being studied. If we compared Cutter's results to data found in Perry & Partridge (2014), the focus groups relating to agricultural resilience noted very strong resilience in rural areas. The dichotomy calls into question the usefulness of the indicators used by Cutter et al. to distinguish between rural and urban areas. A strong indicator in a rural scenario may not be a strong measure in an urban setting. There are questions regarding the applicability of such a generalized indicator toward the county-level resource and design capabilities directed towards resilience and disaster preparedness. Anecdotal evidence suggests that rural communities solve problems on their own and often do not reach out for assistance outside their internal resources. This tendency would be challenging to capture in public data. Kulig et al. (2013, p. 772) notes that a "re-evaluation of indicators of resilience should be made, one that more carefully reflects the relationship between resiliency and the indicators that are proposed in the literature". The Carpenter et al. (2001) study was focused on ecological studies in lake systems. While there are concepts that reach across to communities, the study's conclusions were framed in ecology, not community, perspectives.

Bowman and Parson's (2009) study utilizes a format similar to the current research. The one piece missing is trend analysis between the interview data and the data supporting state-level emergency management decisions. The need for non-specific summaries limits the detail that both the Bowman/Parson study and the current research project can delve into, yet trends can create a picture of interactions across the counties of upstate New York.

The Hyogo Framework for Action 2005-2015 addresses resilience on an international stage and pays attention to what affected communities can do for themselves and how to strengthen resilience globally (Manyena, 2006). Additionally this paper focuses on definitional issues surrounding resilience and if resilience is the opposite of vulnerability. There was discussion about resilience referring to a new paradigm, but the trend was for it to be seen as more of an expression, complementing terms such as vulnerability or risk (Manyena, 2006, p. 2). Caution is noted that further expansion of using "resilient" to describe end user products in communities working on disaster preparedness is not helpful. The work has been done before but attaching "resilient" to the discourse can cause confusion when poverty or vulnerability reduction was the typical terminology used (Manyena, 2006 p. 3). In a positive light, resilience leads to actions by communities enhancing coping capacity rather than focusing on poverty reduction. People see themselves as responsible for change, rather than waiting for nature or the infrastructure to change (Manyena, p. 3). In an April 2017 article, the author notes that emergency management has evolved over the past several decades, and continues to adapt to changing technology and access to the population. The emergency managers understand layers of interaction and a broad stakeholder base. The need for networking is a key aspect of success. The managers succeed through their understanding of the Incident Command System

(Hastings, 2017). While change is evident and progress is occurring, the literature and interviews find counties not always up to date in this area of public awareness and broad network interaction.

Command Functions

The fire and emergency services are well prepared and planned to execute in the case of emergencies, but interaction with the general public is not the primary mission, instead command and control during a crisis is the number one concern (Responding to Incidents of National Consequence, 2004). There are strategies for disaster preparedness but research is unclear on if local fire services have developed disaster plans (Stambaugh & Sensing, 2008). Emergency Management Directors have county emergency management plans (CEMPs) that provide directives and systematic responses to a range of threats to the community. FEMA notes that community resources may not be adequate in a sustained major incident and that additional supplies should be planned for. This forethought and chain of command works to meet the needs of the community and region while not causing additional stress. Another important lesson learned from 9/11/11 incident response was that an organized recall of related personnel is beneficial. Too many volunteers can overrun the command system's ability to work with all of them. If some self-report to a nearby site, that may cause a limited response elsewhere in the incident. This could be argued as one point for limiting community awareness of direct issue protocols. Limiting the command structure can keep responses organized, at least in theory. Counties have active memorandums of understanding (MOUs) with neighboring county services to provide organized back-up services in the case of an incident. Regular communication and practice increases the effectiveness of the response (FEMA, 2004).

Organizational Models

Organizational models describe the structure of an organization and the relationships between people, departments, jobs or agencies within the organization (dictionary.cambridge.org). The intent is to aid in the understanding of interactions across various participants within structures found in governments, businesses and non-profits as examples. The models offer perspectives regarding the systems used to maintain order and keep the organization coherent. In emergency preparedness, the issue of ***who is in charge*** can be addressed by the hierarchical organizational model that is expressed through command and control structures. Wise (2006) acknowledges the need for a hierarchical format for situations that fall within parameters that have been planned for and can use resources within the system under command. This structure treats knowledge as a scarce resource that is concentrated in specialized functional units with the corresponding decision rights (Alder, 2001. Pg. 216). The need changes when an event (disaster) overwhelms the planned responses and requires a broader response using organizations beyond the scope of the command system.

A network model assumes that a functional response to an event will require responses from a variety of organizations, government agencies, nonprofits and for-profits (Agranoff & McGuire, 2003). The diverse organizations can focus on responding and adjusting to needs based on inter-organizational arrangements. The network model does not displace the hierarchical model, it can work in collaboration to broaden the responsiveness to events.

Communicating with the Public

The network and hierarchical organizational models have a common area of interest related to severe events, communication with the public. The command and control structure intersects with the network model in the use of a Public Information Officer (PIOF). The PIOF is responsible for developing and releasing information about an incident to the news media, incident personnel and other agencies and organizations (U.S. Fire Administration, 2016). Agencies will vary in the policies used regarding information release, but the POIF is the point of contact for information to the public. While this is logical, and the LEPC members may be familiar with the PIOF for a county, situations can develop where private citizens are looking for answers, and they are not being directed to the PIOF. The LEPC may serve as a bridge from the traditional hierarchical model to a network model approach. The LEPCs overarching purpose is to develop a strong community network so that data can be shared in the case of an emergency within existing systems and prior to the need for PIOF action.

There is research related to community communication. In 1983 a series of municipal management white papers was published by the International City Management Association. A core finding was that "… Relating to the community and establishing effective lines of communication to neighborhoods is an essential assignment of local government" (Arnold et al., 1983). The study also considered that the average citizen will feel that they can best influence the local government decisions as part of an association or group within the community. The LEPC acts as that form of organization in some counties, but not all counties have public representation on the board.

Methods used to reach citizens include public meetings and hearings or surveys. The meetings are typically poorly attended and the surveys have questionable validity. There are cases of community organizations targeting specific tasks, similar to that stipulated for LEPCs. Communities have tried local cable networks with varied success (Arnold et al, 1983, p. 40). The current trend is toward emergency notification via email and text, however, that is developed for immediate response items and is not suitable for advanced emergency planning (DeRochie, J., 2017). A possible area of improvement for increased community involvement is the concept of "soft infrastructure", defined as the networks, institutions, relationships and social processes that foster civic engagement in public life (Evans & O'Brien, 2015). Berkes (2009) argues that increased complexity of risk in communities challenges the limits of hierarchical control. Collaborative governance using a network of agencies and organizations for support can improve response accuracy and encourage "sustainable patterns of living" across communities and government structures (Evans & O'Brien, 2015 p. 78).

Soft infrastructure, as defined by Kahan et al. (2011) is discussed in regards to resource management and sustainability research, yet the underlying concept of the research is resiliency of a type defined in this paper as well. Evans & O'Brien (2015) note issues that are poorly understood by the general public and are in conflict with immediate self-interest cause reluctance on the part of policy makers to pursue needed legislation. Public understanding and engagement are key to successful implementation of policy instruments that improve community resilience. Policies also need to take into consideration the broader network of agencies and organizations and not try to implement changes targeting a narrow solution (Evans & O'Brien, 2015). The LEPC was originally developed as a community connection to

information and planning directly associated with hazardous materials in a county or region (Local Emergency Planning Committee Guide, 2014). The scope in NY for the LEPC or other community networking structures used by County Emergency Management Coordinators, has grown to include general emergency planning as an element of social capacity across their service area (Emergency Planning Guide for Community Officials, 2008) . Social capital (Bourdieu, 1986: Coleman, 1988) is described as establishing a level of trust, networks, density of relationships, forms of local knowledge, and operating norms that allows democracy and community strength to withstand stress agents. The LEPC and related community networks maintain a level of trust across service agencies and community organizations. They do not, in general, do anything to inform the public directly about emergency plans. The underlying structure of emergency management services is a command and control format similar to a military chain of command (Moon, Carley, Kim, 2013). Communicating with the public is an element within emergency planning; however, its effectiveness is in question based on the literature reviewed.

Emergency Planning Models

There are two culturally relevant models of the content and process of emergency planning: the civic model of the practice of emergency preparedness and the consumerist model of engagement (Jennings et al, 2016, p.9). The civic model includes ordinary citizens in planning and response activities as a part of being an active community member. People will become involved if they think that their participation is relevant and useful. This fully involved community position can aid emergency preparedness in preserving the past, protecting the future, and promote a more secure and resilient future (Jennings et al., 2016. p. 12).

Emergency preparedness is designed to direct people in moments of crisis for the benefit of health and safety of individuals and the community. At the same time, this could restrict their liberty, autonomy and civil rights along with other fundamental interests. Emergencies may require a long-term, big picture view that will require people to act against their short-term interests. "Paternalism" is used to describe the restriction of individual freedom for the sake of promoting that individual (Jennings et al, 2016 p. 6). This form of engagement encourages planners to not share all the particulars of the advance plans that have been reviewed and installed for the benefit of the community. Jennings argues that the paternalistic approach, while unavoidable, also warrants close ethical attention. Community involvement in the planning helps establish that. Americans value individual freedom and are suspicious of authority, yet several studies find that privacy-oriented communities will stand together and help each other out if their community is threatened (Keystone Center, 2007; Kings Fund, 2004, in Jennings et al, 2016). This same drive for privacy, while pushed aside in time of need, can turn to disillusionment, recrimination and litigation if the planning phase is not fully transparent, explained, and justified (Jennings, 2016, p. 8). In contrast to the citizen model, the consumerist model maintains providers with specialized knowledge that are prepared as a product of consumption. The individual is not privy to the details of the emergency plan. Vawter argues that the plan is an "expression of the entire community about the value of the lives and health of its members" (Vawter et al., 2010, p. 10 in Jennings et al, 2016). The civic model is more engaged and sustainable as individuals do want some sense of control of their fate. Complete reliance on others does not sit will, at least with rural residents in New York State (Perry & Partridge, 2015).

In 2011, eight government agencies and one community resilience group conducted a study of how to increase the nation's resilience to disasters. The result was a vision statement for a resilient nation by 2030. This included: "embracing a culture of resilience"; organized community coalitions; and information on risks and vulnerability is transparent and easily accessible to all. The committee provided six broad recommendations as an effort to move national resilience forward. One component suggested that the Department of Homeland Security lead partners to develop an essential framework to address resilience. Another component has Homeland Security and the Department of Health and Human Services lead the creation of local and regional resilience coalitions (Meyer-Emerick, 2016). While some states may still be lacking this level of alignment, New York has taken the initiative and has established local, regional and state standards and protocols that meet the intended goals. The LEPC or equivalent structures provide elements of the desired interaction. However, this preparedness is at the community level. Measurement of individual household preparedness may yield very different results, and is beyond the scope of this research. Paton and McClure (2013) found that generally people take more precautions for high frequency events (e.g., theft) and prepared less for low frequency events even if the losses are potentially higher. Citizen participation in community efforts including Community Emergency Response Teams (CERT), volunteering for their local fire department, assisting the Red Cross, even being a part of the Boy Scouts or similar organizations that teach basic survival skills and engage in broader community interests will better prepare individuals for emergency action.

One tool used to improve communication of preparedness principles to community members is the concept of social marketing for emergency preparedness. This is not social

media, but a planning model that is well suited to emergency preparedness planning. Social marketing has been around since Philip Kotler and Gerals Zaltman (1971) used the term to describe "the use of marketing principles and techniques to advance a social cause, idea or behavior" (Lee and Kotler, 2011, p. 12). Lefebvre (2013) notes that this is a systematic approach to problem solving rather than a behavioral theory. There are many versions of the planning process available via the internet. Unfortunately, it is not commonly used in emergency preparedness since most emergency managers are not familiar with social marketing. This impacts the range of opportunities considered for developing stronger public preparedness (Littlefield et al., 2010, p. 30, in Meyer-Emerick, 2016).

The literature intersects the three functions considered by this study regarding emergency preparedness: resilience, command function, and communicating with the public. Resilience is a function of the entire community with assistance in organization by the EMC. Command function is the hierarchy that keeps systems coordinated and is a coordinated effort of police, fire, and the EMC. Communication with the public may reside in various agencies or organizations in a particular county. The Local Emergency Planning committee interconnects the three functions. The committee includes key service providers in each county, has existing command function agencies present, and often has an association with community organizations as well.

Current Project

The current study considers the loose, varied partnerships established by community governments, agencies, public and private institutions and citizens in an effort to build a

resilient network prepared and adaptable to severe events as they unfold. The research will specifically inform the county-level participants regarding areas of strength and weakness in relation to interactions with community entities during planning stages of emergency preparedness.

The expectation that each upstate county will prepare a comprehensive emergency management plan is stipulated in NYS Executive Law Article 2-B. The plan is submitted to the state at the end of each calendar year. If resilience is a process, not an outcome (Norris et al., 2008) then a degree of engagement at all times is necessary to keep the process moving and prevent it from stagnating. Longstaff (2005, p. 55) notes that, "A trusted source of information is the most important resilience asset that any individual or group can have." While all counties in New York have a person assigned to coordinate emergency efforts, it remains unclear if each county has a person specifically tasked with organizing efforts and groups along with directing communication with the public in times of stress.

Chapter 3
RESEARCH METHODS

Purpose of the Study:

The intent of this study is to determine how the LEPC involvement in emergency planning, in conjunction with county emergency coordinators, impacts the knowledge of community members about emergency action plans and implementation procedures for severe weather events. The counties across upstate New York are diverse in population, both urban and rural, and, due to geographical location, see a wide range of challenging weather situations. The study focuses on emergency preparedness across this diverse landscape

including both differences and similarities between the rural and urban areas. This project builds off of an agricultural resiliency study (Perry & Partridge, 2014) with a specific focus on communities that include rural, low population density areas. Counties in close proximity to and including New York City were considered distinct from those upstate due to size and scope of both population and resilience parameters that differ in megacities (Gasparini et. al., 2014) such that they were not included in the project scope. Other large cities including Syracuse, Albany, and Rochester work directly with their surrounding counties. They have urban perspectives, yet they are part of the broader county emergency planning.

Local Emergency Planning Committees (LEPC) and County Emergency Coordinators are intended to act as a conduit for local response planning (NYS Executive Law Article 2-B). Although New York State mandates that each county establish an LEPC, preliminary evidence (NYS Homeland Security, personal communication, January 20, 2015) suggests a high degree of variance in actual achievements of the committees. This study is attempting to better understand the emergency management process across rural New York by examining the use of the LEPC across upstate NY counties, the prevalence of County Animal Response Teams (CART) and the involvement of NY Extension Disaster Education Network (EDEN) in county emergency planning. The LEPC represents a level of organization and communication that lends to strong community resilience as noted in Chapter Two. It is a structure that is recognized nationally and as such is an appropriate starting point in determining the organizational system used at the county level for emergency planning. With the LEPC as a common reference point, additional points that work to possibly distinguish rural and urban counties are needed. The County Animal Response Team (CART) availability is a measure of the community preparedness

for non-human life response in emergencies. This is used as an indicator of emergency planning connecting to agricultural resources in each county. The CART is utilized across the country at both the state and county levels. It is considered an indicator of the breadth of emergency planning as non-humans are important but different from human life issues triggered in an emergency situation. The initial assumption is that rural communities would be more likely to have a CART program than urban counties, but that remains to be seen based on interview responses.

The LEPC is also touted as a pathway to community awareness and interaction in emergency planning. NY Extension Disaster Education Network (EDEN) has a focus on emergency preparedness education and is used as an indicator of community-generated preparedness activities beyond that found in the LEPC. NY EDEN is part of a national EDEN network that utilizes county Extension personnel to track storm damage and recovery efforts. Its utilization across counties is variable and not clearly defined at this point, so this study seeks to add clarity and further define the level of utilization across counties.

Methodology

In utilizing mixed methods, I intend to include elements supported by both the positivists and constructivist frame of reference. A broad research question that captures the qualitative aspects of the study is supported by incorporating two hypothesis that have closed-ended questions associated with them, the study is structured to generate a degree of quantitative data in addition to qualitative perspectives about the research question. This spectrum of data collection enhances the value of this study for its exploratory purpose. Having

both elements allows me to capture a broader range of responses, determine if the hypotheses are correct, and identify areas of further study.

The overarching research question that guides this study is: What does the communication network for upstate NY counties include to enable effective emergency responses to potential disasters?

Hypotheses

Two hypotheses help to narrow the information gathered in this study:

H1. There is a spectrum of involvement and commitment levels by county LEPC's to assist in emergency planning.

H2: Rural communities demonstrate more involved use of LEPC's in emergency planning than urban and suburban counties.

Research Questions to inform H1 and H2:

1. Will a full and involved LEPC at the county level increase Emergency Management staff's contact with community organizations and therefore increase the strength of communication networks within the county?
2. Does the involvement of the Emergency Coordinator through leadership and resource allocation with the LEPC stimulate more activity in the committee to build networks and use committees to impact county planning and emergency response?
3. Is there an active County Animal Response Team and what structure is used to meet the demand?
4. Where is NY EDEN (Extension Disaster Education Network) connected to county level emergency planning and is its use only associated with counties where Cooperative Extension utilizes the EDEN Network?
5. Do county emergency plans include private resources as an aspect of implementation in the case of a severe weather event? If so, how? Are they noted in the plan or is it simply assumed they will respond if needed?

Figure 2. Hypotheses and Research Questions

Operationalization of Measures:

This study utilizes a design built to capture snap-shots of local behavior that can be compared to state-level data from the New York State Office of Emergency Management within the Division of Homeland Security and emergency services. An interview is utilized to gather information from upstate community emergency coordinators to ascertain the nature of the performance regime established in each area and the nature of engagement from the LEPC in the regime. The study seeks to determine what variations there are, if any, in the use of LEPC or other organizational structures to facilitate emergency preparedness in counties across upstate New York.

Research Event Timeline

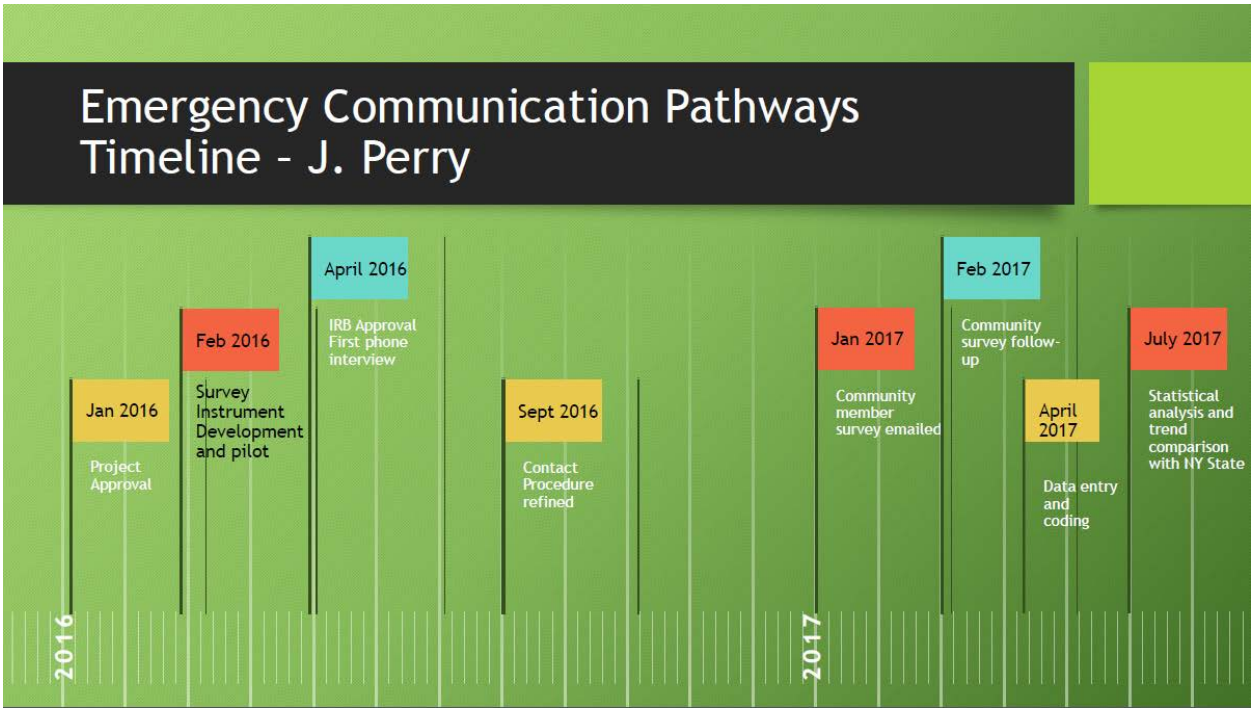


Figure 3. Emerging Communication Pathways Timeline

Project development

This research study grew from an anomaly discovered when working on an Agriculture Resiliency Study with a graduate student (Perry & Partridge, 2014). That project first introduced me to emergency planning and the county infrastructure supporting these efforts. A discussion with the New York State office of Homeland Security verified that there was not a clear understanding of how the counties were responding to state mandates to utilize a Local Emergency Planning Committee (LEPC). I presented the idea of pursuing this unknown aspect of the LEPC to my research committee as an effort building upon the underlying knowledge developed through the resiliency project.

National LEPC Survey Use

The use of LEPCs was initiated as part of Title III of the Superfund Amendments and Reauthorization Act (SARA) passed in 1986. LEPCs began to be implemented after that with the EPA surveying compliance in 1994 and 1999. In 2008 a comprehensive survey was initiated nationally to determine the progress of LEPCs in working with local citizen communication, proactive accident prevention efforts and the effectiveness of products and services provided by the Office of Emergency Management at the national level. This survey was also deemed important due to the events of September 11, 2001 and the change in data available for planning in subsequent years (Nationwide Survey of LEPCs, 2008). The results and trends reported are discussed at length in Chapter Four.

State LEPC Data

The state-level data collection was intended to be built upon the County Emergency Preparedness Assessment (CEPA) information collected for each county by the New York Department of Homeland Security. Once contacted, the Department of Homeland Security staff was unable to provide specific CEPA data for counties due to an agreement with the counties to protect their data from misuse. The Homeland Security staff was willing to engage in a discussion following the data collection to compare local-level observations found in the current study with the observations noted in state-level data. This trend analysis adds depth to the analysis in this study that was not available in the Bowman and Parsons study (2009) that helped inform the development of the current research.

Foundational Study

The Bowman and Parsons (2009) study noted in Chapter Two, developed case studies of five counties in South Carolina and assembled performance regime characteristics for all five. The results were of interest and inform the current study through the suggestion that "…hazards emergency management depends on durable ties both within and beyond the community, then counties studied here fall short to varying degrees" (Bowman & Parsons, 2009, p. 22). Five counties are a very small sample on which to build suppositions of network strength. As a researcher, I prefer case studies as a methodology; however, in this situation, if we broaden the study sample then variations may become more evident and applying the results across the state is supported. The survey instrument aims to get at the "durable ties" from the perspective of the staff member that is critical to maintaining network connections.

At first, an open-ended interview structure was considered. However, given the population size of 51 counties and intent to determine variations in the LEPC actions, specifically, the decision was made to develop an interview format that included both open and close-ended questions. The goal was to decrease the qualitative coding element and incorporate questions with distinct categorical answers as a way to balance the qualitative and quantitative perspective in the study.

Population and sampling development

Fifty-one counties comprising upstate New York population areas were selected for the target population of the study. Eleven downstate counties (including Long Island) were not included due to the population density and lack of open space in the counties. The underlying research that initiated this project focused on counties with significant agricultural production and was limited to the upstate counties for ease of access and urban/rural interaction. Counties were categorized as urban or rural based on population density data found in the US census (https://www.health.ny.gov/statistics/vital_statistics/2006/table02.htm). Counties were also categorized by the Emergency Services Regions as identified by the New York State Division of Homeland Security. There are five regions with ten response zones identified, two response zones per region. The counties were coded by response zone as a possible determining factor of significance due to regional variations in disaster events. A third categorization used to group counties was based upon Federal Emergency Management Agency (FEMA) disaster declarations by county in the past 10 years (https://www.fema.gov/states/new-york).

Each county has an emergency management coordinator (EMC). County websites were utilized to identify the individuals to contact in each county. Email addresses were captured if available, however, generic email addresses using county drop boxes were not utilized. Phone numbers were recorded as a starting point for contacts if emails were non-responsive.

Research Topic Approval by graduate committee

My dissertation committee reviewed the proposal, discussed implications and modifications, then suggested edits and improvements. We discussed a revised version of the proposal and research questions. The project was approved to move forward and refine survey questions through research with county emergency management coordinators.

Survey Instrument Development

The County Emergency Preparedness Assessment (CEPA) tool includes four categories of preparedness: hazard assessment; capability assessment; response capacity; and resource inventory and needs. Interview questions asked emergency managers two questions for each category regarding the level of LEPC involvement. The original intent was to use a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) for several of the questions, as used in earlier studies. (Heath, Bradshaw, Lee, 2002) and leave the second question open-ended for more detailed discussion. During the interview process, responses to the scaled questions were found to have more variance than expected, providing more depth to the answers, so the answers were captured and coded into a scaled value after all interviews were complete. In addition to asking about emergency management coordinator responsibilities, the interview also probed coordinators' knowledge of area businesses.

Businesses are encouraged to have emergency management plans of their own; however not all industries are regulated to the same degree in terms of compliance. H2 proposes that rural emergency plans, with the help of the LEPC, take greater account of existing business emergency planning and have additional measures in place to facilitate the protection of local business resources. This was determined by asking yes/no questions regarding emergency plan inclusion and LEPC involvement across four areas: 1. Contacts with local businesses regarding spill and containment issues; 2. County Animal Response Teams (CART) are in place for counties heavily invested in animal agricultural; 3. Awareness by the county emergency manager of business-initiated emergency plans; 4. Resource/risk inventory lists are available to the emergency coordinator and were created with assistance from the LEPC.

National and state-level data suggest the LEPC structure is utilized differently from county to county. Research Question #2 explores whether the guidance of the county emergency coordinator has a direct influence upon the commitment and participation of the LEPC to emergency preparedness operations. Documentation of this question was gathered by asking each participant four questions targeting who directs development of the yearly program of work; use of sub-committees within the LEPC; what is the commitment of members to the LEPC as observed by the respondents and what impacts that level of commitment.

Mapping Interview Questions onto Research Questions

The research questions used to support hypotheses 1 and 2 provide the framework for interview question development. Research Question One (R1) asked if a full and involved LEPC at the county level increases emergency management staff's contact with community

organizations and in that manner, increases the strength of communication within the county. At the beginning of the interview three demographic questions were asked as a way to consider staff variations as a possible variable influencing R1. Interview Question #1 (Q1) – number of years in the emergency coordinator position; Q2 – full or part time position; and Q3 – how many staff full time equivalent (FTE) positions were specifically working in emergency planning areas. Q4 asked if there was a county command center available with the expectation that such a communications hub would be a critical part of connecting the emergency coordinators with community leaders. Q5 asked for a list of the top ten agencies that emergency coordinators interact with in real time during an emergency response, assuming that fire, police and the County Department of Transportation were first to be contacted. This was an open-ended question posed to consider connections that may exist outside of the LEPC and therefore impact the strength of R1 considering LEPC involvement and R2 asking about the emergency coordinator's leadership through the LEPC. A broad array of direct access channels could be a factor in diminished LEPC influence. The next three questions work to capture a picture of the LEPC for each county. Q6 asked if an LEPC is present and how often it meets. Q7 inquired about the number of organizations represented on the LEPC to gauge the scope of activity and depth of communication available within the organization. Q8 asked how consistent the various agencies and organizations are in participating on the LEPC and attending meetings. This series of questions starts to provide a picture of the strength and scope of the LEPC as part of the emergency planning program for a given county as it relates to R1.

Research Question R2 considered the interaction of the EMC and LEPC towards county planning and emergency response. The middle block of interview questions (Q9-Q17) attempt

to capture examples of community involvement in emergency planning across the categories found in the state level CEPA data (hazard assessment; capability assessment; response capacity; and resource inventory and needs of the County Emergency Management Plan (CEMP)). Q9 targeted the LEPC involvement in development of the CEMP specifically. This question emerged through discussion with an emergency coordinator whose impression was that not all counties used the LEPC for that task. Q10 asked for a specific example of community involvement in developing the CEMP. This may occur directly through the LEPC, but the question was left open to not lead the respondent to that specific answer. Q11 looked for community partners involved in developing the county hazard assessment process with an example if available. Q12 looked at response capacity beyond government agencies (local, county, state) as a capture point of how deep communication went into the community. If individuals and businesses were part of the communication pathways during emergencies, that suggests a level of networking and involvement in the planning that could vary from county to county. This relates to both the R1 network question and R2 emergency planning and response. Q13 followed up on the resource use question and moved to the county response capacity in a planning perspective. Q14 returns to a specific LEPC question in terms of who develops the plan of work for the LEPC. While researching the LEPC creation, two options in leadership emerged. There are counties where the emergency coordinator directs the work plan for the LEPC and in other counties an LEPC chairperson is elected within the group and they coordinate with the emergency coordinator, but the chairperson directs the plan of work. This variable impacted R1 and R2 as they are considering emergency coordinator impact.

Q15 considered commitment level of organizations identified in the CEMP and specifically asks about non-government entities (agriculture and industry specifically). This question targeted R5 as an aspect of local resources being included in the CEMP; however, R1 is also impacted as the non-government entities are critical to the communication network. Q16 was an open-ended question asking the emergency coordinator what they perceive as the most impactful element leading to success of implementing the CEMP. Such a question moved past the various pieces of the project and asks for the most important one from a coordinator's viewpoint. This study is working to gather a perception of a similar issue but through the lens of the LEPC. The question also gave a glimpse into the priorities of the emergency coordinator. All of the questions are being answered from the EMCs standpoint so an awareness of how they consider success may be a factor influencing other responses. Q17 acted as a transition question from LEPC-oriented inquiry to community-level inquiry. Q17 directly asks about hazardous spill or containment issues. The LEPC funding was originally focused on hazardous materials. This helped support the development of Hazardous-Material teams within and across counties. In addition, the LEPC was intended to develop lists of business contacts to be used in case of a spill. Q17 tried to connect the LEPC to an actual response process.

The final block of questions focuses on community capacity and response to emergencies. Q18 specifically asked about a County Animal Response Team (CART) as a means of capturing the readiness of rural communities to deal with livestock issues in an emergency. Although urban areas do have CART teams as well, they are focused on pet-related issues. When looking for a way to distinguish rural and urban communities, the CART team appeared to be a readily available tool that could distinguish the two. Q19 moved the county emergency

plan to the individual business level and checked on the emergency coordinator's awareness of local business emergency plans. This included a descriptive placement of how well the business plans were developed from the perspective of the emergency management coordinator. This question relates back to R2 and the leadership of the EMC within the community. Local business planning and awareness stemmed from discussions with businesses in the research by Partridge and Perry (2014) about resilience. Some operations had plans identified but many did not. If a community had an active LEPC, would those plans be more evident? Q20 looked for specific resources available to counties from local businesses as a measure of how broad an impact the LEPC had on emergency planning and the ability to respond beyond governmental agency resources. Q21 focused on NY EDEN and the awareness and use in the CEMP. This relates to R4 to capture awareness and integration of NY EDEN into county emergency planning. Q22 revisited the local resource availability and their use in the county emergency plans, directly answering R5 while building upon Q20.

The community member interviews were intended to capture perspectives of the emergency management of a county from a resident. This study focused on residents with an agricultural reference point, building upon the earlier resilience study of Partridge and Perry (2014). Specific questions aligned with questions asked of the emergency coordinators: What mechanisms were available for the emergency coordinator to interact with community members? A second question asked about key players in the agriculture or industrial sectors that would be able to communicate the residents' needs beyond police, Red Cross, and hospitals? A question asked the resident to rank the county preparedness and a follow-up question asked about business and personal emergency plans. The final questions were

specifically in line with emergency coordinator questions. Does the county have a CART team available and were the residents familiar with NY EDEN? The intent was to keep the interview short so that it would be easier to gain responses.

Interview Question Review and Refinement

Refining the survey instrument and research questions involved an in-depth discussion with my local emergency management coordinator and several visits to the local LEPC meetings. This process refined my knowledge of vocabulary and interactions common within the emergency preparation community. The state captured data via a CEPA assessment tool. The emergency coordinator worked closely with the LEPC, but not in all counties. The interest in networking presented by the emergency coordinator appeared to have an influence on the organizations involved and procedures developed at the county level. This new knowledge and refined questions led to an updated interview protocol that was submitted to the Institutional Review Board (IRB) for approval.

IRB Approval

This research used phone interviews and limited the personal data collected for each participant. IRB clarified the consent form to be used for each participant and beyond that accepted the format as presented. Approval was granted in early April of 2016. The first phone interview was secured shortly after that date.

Survey Distribution:

The survey instrument was designed to be used via a phone conversation to allow for extended responses on many of the questions. The trick was securing appointments for the interview. The first contact was via email to all counties briefly explaining the research purpose and requesting a thirty-minute discussion regarding their county planning and experience. A handful of response emails were received and interviews established from there. The remaining counties were followed-up by phone calls to establish contact. Many counties had experienced staff changes not recorded on websites so information was updated and additional calls were made in an attempt to connect with the appropriate individual. Return phone calls and catching individuals in offices were very challenging during the summer months and continued until September 2016 when a new tactic was developed as noted below.

Community Member Interview:

The original intent for the community element (with a rural/agricultural interest) was to secure two names from the Emergency Coordinator of people they work with in their planning efforts. That idea proved problematic either due to unwillingness to share names or limited access to that specific community group. The alternative that was developed was to use a one-page survey of questions developed from the original list that would be emailed out to County Farm Bureau Presidents as they are typically active in the agricultural community and larger community as well. Response from the email was very limited. The next step was to connect with Presidents face-to-face at the American Farm Bureau conference. That yielded a second burst of interviews but numbers remained small. The next group targeted were agriculture

educators in the counties that had responses from Emergency Coordinators. As a former agriculture instructor, I knew this group of professionals and they are always active in their community. The educators were interviewed at their annual professional development conference in June of 2017. The sample number is still not large, but the discussion was very consistent. Initial Survey contact was through email to county emergency coordinators and generated the first phone interview on March 30, 2017.

Contact procedure refined

County EMC contact efforts continued through the summer of 2016. Emails were sent typically twice with a phone call follow-up. In many cases a second phone call was logged. In the majority of these cases the emails were not responded to nor were phone messages returned. In September 2016 I met with my committee chairman to discuss the lack of progress and frustration with lack of contact response to the point of redirecting efforts into a new research project. We discussed options and the amount of progress made to date. I reviewed the successful contacts and found that beyond a few email responses, personal communication via phone was a key to setting up an interview. Tactics were modified such that phone calls were made Monday morning before 11 am to county emergency preparedness offices. The intended recipient was typically in the office at that time and answered the phone. At that point we scheduled an agreed-upon time for the 30-minute interview during that week. While not a fast process, the success rate increased quickly. The resulting sample size of twenty-four counties resulted in a 47% response rate.

Data Capture

All interviews started with the IRB consent statement and brief statement regarding purpose of the study. All discussions were recorded in the form of notes during the interview process. Following the interview, all notes were coded into an excel spreadsheet organized by survey question number. One worksheet was used for emergency coordinators and a second sheet was used to capture community member interviews. Eleven questions were close-ended in nature and could be coded into the spreadsheet with a limited number of responses. Eleven questions were free response and summarized comments were entered as data points.

Data Coding and statistical analysis

The first attempt to process interview excerpts into trends and look for patterns involved work within excel. Close-ended questions were numerically coded for statistical analysis. Several text responses were color coded into specific categories along a spectrum of answers. Some patterns were starting to appear but statistical analysis within excel was limited. With assistance from the Statistical Consulting unit at Cornell, I was introduced to JMP (SAS Institute, 2012) and the excel spreadsheet was imported into JMP for more detailed analysis. The ability to use characteristics of urban / rural; the number of declared disasters in a ten-year period; and the NY Emergency Service Region of each county helped delineate possible differences in responses. The resulting statistical findings are reported in Chapter Four. The open response questions used the color coding to distinguish trends in responses are discussed in Chapter Four as well.

Study Sampling and Population

This study targeted two populations related to emergency communication and the LEPC. The primary population were the emergency management coordinators for upstate counties outside of the metropolitan New York area. Interview questions were developed building upon case study results in Bowman and Parsons (2009) and questions stemming from prior research within New York on resilience in rural communities (Partridge & Perry, 2014). Twenty-two questions were utilized in the interview. Eleven required open-ended answers that were refined through discussion with the participant. The interviewer's notes were coded into an excel spreadsheet for analysis using JMP. The overarching purpose of the interviews was to capture responses and compare emergency preparedness communication pathways from one county to another. County responses could then be compared to the aggregated analysis of the state-level CEPA data to determine variations in the actual responses at the county level.

The second population interviewed was consumers, or community members, within each county. Farm Bureau presidents or high school agricultural educators in each county were contacted and asked ten questions that attempt to garner their perspective on county emergency planning activities and communication. Interview responses were coded into excel for tabulation and analysis using JMP statistical software.

The qualitative analysis in this study is attempting to interpret or understand the variation in county implementation of the state requirement for an LEPC. While the committee might be available on paper, anecdotal evidence suggests that not all counties are utilizing the LEPC in the same way or using it at all. What do the variations in answers to interview

questions mean in terms of application and efforts to communicate emergency preparedness from the county command structure out to the general public?

Analysis and Interpretation:

Two types of interview questions were utilized: distinct, close-ended questions that can use quantitative analysis, and open-ended prompts that are qualitative in nature. Multiple questions had a range of specific answers that were categorized into sub-groups as part of the analysis. Qualitative questions were color coded based on trends observed in the first review of all the data. Color coding was used to easily distinguish the range of categories used in the first coding session. A second session reviewing all entries by primary codes was completed to determine any variations that occurred within the categories (Creswell, J., 2009). Once variations were established, the responses were number coded for analysis.

Reliability

Reliability was considered as interview questions were developed and piloted with the target audience. In concept, another interviewer, using the same questions, would elicit the similar responses. This study was limited to only the researcher for administering interviews and coding the interview data. The study is relying on the knowledge, judgement and prior experience of the researcher to maintain data strength. Reliability is an unanswered issue at this point.

Validity

Four validity strategies are utilized in this study:

1. Data from the interviews revealed patterns that were compared with patterns observed by the New York State Department of Homeland Security and with patterns developed

from a national level survey regarding LEPC's. This multi-level comparison of patterns observed at the county, state, and national levels constitutes a form of triangulation. The state observations stem from specific data collection instruments used with the same counties in NY. The national data is not as directly comparable due to variations state-to-state in reporting and function of the LEPC.

2. Member checking of findings is related to the triangulation in step #1. The findings were organized into patterns which could then be compared directly to trends observed at the state level. The two studies used distinct questions to approach a very similar overarching question. The ability to discuss trends was very helpful in noting any unusual change in responses within the current study.
3. Researcher Bias and Knowledge Limitations: Personal bias might be found in my complete professional life spent in rural New York and Virginia. I did spend two stints in my childhood in suburban communities, but I have not spent extensive time in urban areas. This study is targeting the potential differences between rural and urban emergency preparedness networks. The exciting aspect of this project is that I did not have any awareness of emergency preparedness including the planning and coordination expected at the county and state levels until a brief brush with the concepts during the agriculture resiliency study. Delving into the multiple facets of emergency planning has been a steep learning curve. My dissertation committee has broader experience in the social structures, but beyond that, every meeting has featured active discussions about what is in place and broader implications.

4. Discrepant Information: Chapter four will include a discussion of examples that are composed of experiences that are positioned contrary to the general patterns, when available. This is the benefit of open-ended questions; more depth of perspective can be shared with the reader as part of the interpretation of data.

   (Patton,2002)

CHAPTER 4

RESULTS

This study attempts to distinguish the variations in communication pathways used in emergency planning at the county level across upstate New York. Central to this discussion are the Local Emergency Planning Committee (LEPC) and the Emergency Management Coordinator (EMC) for each county. The goal is to understand how the Emergency Management Coordinator (EMC) and their staff interact with community entities for emergency planning. Two additional entities are explored in the study. The County Animal Response Team (CART) captures responses to non-human emergencies, especially in rural counties. This provides a connection to the agricultural sector of a community since many of the counties with large animals maintain a CART team and equipment. There are urban counties that also use CART teams and focus on pet assistance, but that is a less frequent occurrence as noted later in the data. The NY EDEN (Emergency Disaster Education Network) is a state-wide program focused on emergency preparation outside of direct county governance, offering communities a mechanism to educate and better prepare community members for potential emergency situations in their communities.

The **research question** that guides this study centers upon: What does the communication network for upstate NY counties include that enables effective emergency planning and response to disasters? Two hypotheses help to narrow the information gathered in this study: H1. There is a spectrum of involvement and commitment levels by county LEPC's to assist in emergency planning and H2: Rural communities demonstrate more involved use of LEPC's in emergency planning than urban and suburban counties.

Data Analysis

The collected data includes both quantitative data and qualitative comments that are coded to identify specific trends or interactions. The survey questions correspond with the five research questions that work to explore the two hypotheses. In addition, the open-ended questions are analyzed for detailed examples and similar situations across counties.

Each research question is motivated by a desire to uncover patterns related to the areas of study. The interview responses can be compared based upon three specific grouping variables. One variable considers the county responses based upon what emergency service region they are in as determined by NYS Division of Homeland Security (Appendix, Figure 11 p. 123). Each region may communicate and operate in similar forms that that could be observed in the data. A second variable for sorting responses is the population density broken into "urban" or "rural" counties https://www.health.ny.gov/statistics/vital_statistics/2006/table02.htm. The determination of urban vs rural used a density value of 130 people per square mile as the dividing line due to knowledge of the counties in question and the rural and urban/suburban nature of small cities in upstate counties. The selected population density was used when

considering the upstate counties and the blend of suburban rather than high-density urban residence patterns in heavily populated counties. The second hypothesis (H2) suggests an urban/ rural differentiation in preparedness that should appear in the data. The third sorting category used was the number of declared disasters in a county within the past ten years (FEMA, 2004). This grouping captures communities that have more experience with disasters and may utilize their experience to develop stronger planning to offset the risk of reoccurrence. An argument can be made that each of these three categories may correlate to a change in the county population's use of the LEPC. If enough counties aggregate into similar experience groupings, that may be evident in similar choices regarding use and investment of LEPC resources.

Survey Results

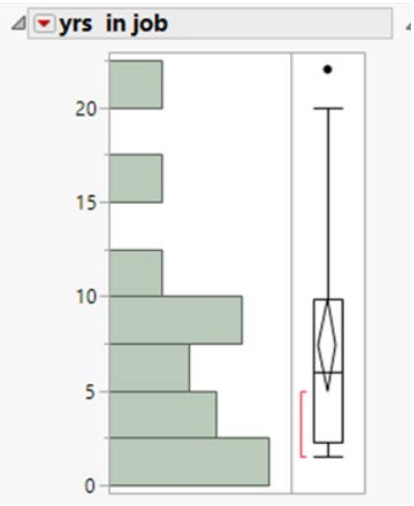
The first four survey questions gathered data regarding the County Emergency Coordinator that is used for both Research Question 1 (R1) and Research Question 2(R2).

Question Q1: The number of years an emergency management coordinator (EMC) was in their position ranged from over 20 years to within their first year on the job. The mean across sampled counties was 7.4 years in the job. Many had years prior to the current position in fire service or related fields, but were still early in their EMC careers (See Figure 4).

Question Q2 inquired about full or part-time positions. All counties that responded had at least one full-time person involved in emergency preparedness. Twenty five percent of counties hired one full time EMC while 75% listed 1.5 up to 6 full time staff (only one EMC per county).

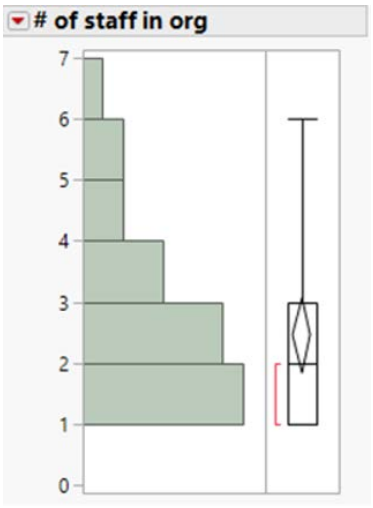
Question Q3: The majority of counties' staff levels fell between one and three full-time staff members specifically working in emergency management (See Figure 5). One and two person departments were reported in 58% of counties responding. There were counties that integrated the emergency management into fire management or even the sheriff's office, but no clear pattern emerged. The small staff was well connected with related agency personnel, but were the only ones with sole responsibility for emergency planning.

Question Q4 asked about availability of a county command center. All counties reported that a command center was available with several having mobile centers on stand-by as well as a fixed location.



Summary:	
Mean	7.44
Std Dev	5.80
Std Err Mean	1.18
Upper 95% Mean	9.88
Lower 95% Mean	4.98
N	24

Figure 4: Years in Job as EMC:



Summary:	
Mean	2.46
Std Dev	1.45
Std Err Mean	0.29
Upper 95% Mean	3.07
Lower 95% Mean	1.84
N	24

Figure 5: Number of Staff in Organization:

Research Question #1:

The first research question states that an involved LEPC will increase an EMC's contact with community organizations and therefore increase community network strength. Questions Q5 through 10 target R1 specifically while 12, 14, and 15 relate to both R1 and R2.

Question Q5 asked each EMC to list the top agencies they have direct, real time contact with in an emergency beyond the local fire and police agencies (see Figure 6 and Table A). The Department of Transportation (State and local levels) was the first agency always noted across all counties. The second most prevalent was mental health agencies (100% of urban and 47% of rural counties). Third in line was the Red Cross (86% urban and 71% rural). Urban counties contact hospitals and utilities next while rural counties reach for town legislators and utilities. No other patterns appeared. The list then gets diffuse, with agencies and institutions that are unique to each county situation or established communication pathways. These range from local colleges to Cooperative Extension and the local HAM radio operators. In some cases Homeland Security is included but it could just as soon be a law office. The question asked specifically for the top contacts if a situation arises so the number provided ranged between 8 and 10 contacts. A secondary layer of communication would be a likely occurrence once the initial stage of response was engaged, but that was beyond the scope of this study. A deeper network of agencies and community organizations would be brought in to support the initial response to a disaster. The question stated that local and state police and local fire were to be the point of first contact. The local and state department of transportation (DOT) was third in almost all situations at 95%. Red Cross, even as a non-governmental organization, was fourth in

75% of counties. The Mental Health professionals and hospitals, if combined, reach 99%, however mental health was mentioned specifically in 62% of responses and hospitals were 37%. Utilities and Town Supervisors (legislators) were both listed in 50% of responses. The Department of Environmental Conservation (DEC), Homeland Security, and Office of the Aging were all noted in 30% of responses.

Figure 6: PRIMARY CONTACT BY EMC IN EMERGENCY RESPONSE

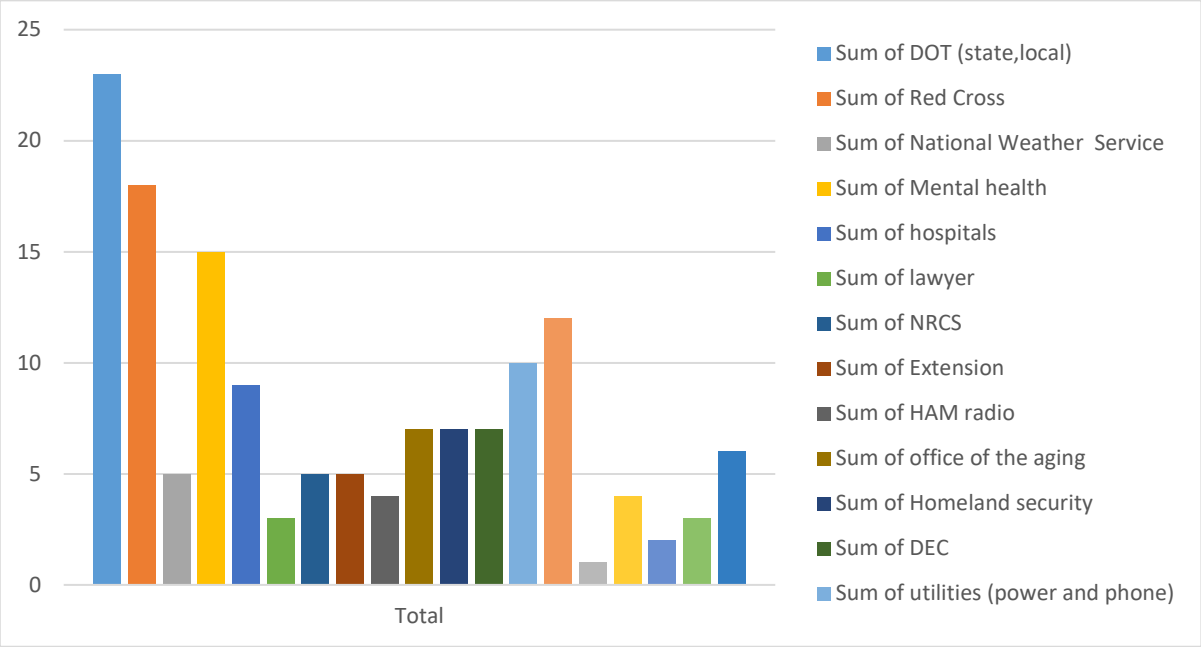


Table A: PRIMARY CONTACT BY EMC IN EMERGENCY RESPONSE

Agency	No	%	Yes	%
DOT (state,local)	1	4.17%	23	95.83%
Red Cross	6	25.00%	18	75.00%
National Weather Serv	19	79.17%	5	20.83%
Mental health	9	37.50%	15	62.50%
hospitals	15	62.50%	9	37.50%
lawyer	21	87.50%	3	12.50%
NRCS	19	79.17%	5	20.83%
Extension	19	79.17%	5	20.83%
HAM radio	20	83.33%	4	16.67%
office of the aging	17	70.83%	7	29.17%
Homeland security	17	70.83%	7	29.17%
DEC	17	70.83%	7	29.17%

utilities (power & phone)	14	58.33%	10	41.67%
Town Supervisors	12	50.00%	12	50.00%
EPA	23	95.83%	1	4.17%
colleges	20	83.33%	4	16.67%
media	22	91.67%	2	8.33%
transportation	21	87.50%	3	12.50%
state emergency center	18	75.00%	6	25.00%

Question Q6 asked about the use of an LEPC and frequency of its meetings. Table B shows the results. Across the sampled counties there is no clear trend in frequency of meetings and no significant difference between urban and rural counties. Three counties did not have active LEPC committees, approximately five counties met once a year, five met every other year and five met quarterly with three counties meeting monthly. The distinction of meeting frequency was significant when compared between urban and rural communities. The rural communities met more consistently and often than the aggregate urban community value, a result that supports H2 and the LEPC use at a higher rate in rural counties.

Table B : How Often LEPC committees meet

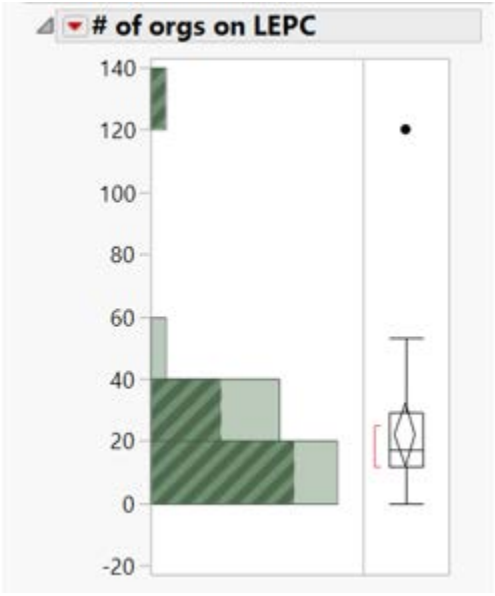
How often LEPC meet	Count Total %	rural	urban	Total
		Pop Category		
0		3	0	3
		12.50	0.00	12.50
1		5	2	7
		20.83	8.33	29.17
2		3	2	5
		12.50	8.33	20.83
3		4	2	6
		16.67	8.33	25.00
4		2	1	3
		8.33	4.17	12.50
Total		17	7	24
		70.83	29.17	

LEPC Meeting Frequency Key
0 = none
1 = annual or bi-annual meeting
2 = quarterly
3 = bi-monthly
4 = monthly

Tests:

N	DF	Fisher's Exact Test
24	4	0.03 p value

Question Q7 captured how many organizations are represented on the LEPC. The question did not request specific names. Counties indicated general service providers both public and private in the list (see Figure 7). The median participation number is 17 organizations with a mean of 22 groups. One urban county did invite 120 organizations to the table, which skewed the data. The active counties fell within the 20 to 30 participant range. Enough counties used that same size group so as to not be useful as a distinguishing feature of LEPC use or development in the county.



Quantiles		
100.0%	maximum	120
99.5%		120
97.5%		120
90.0%		44
75.0%	quartile	29
50.0%	median	17.5
25.0%	quartile	12
10.0%		0
2.5%		0
0.5%		0
0.0%	minimum	0

Summary Statistics:

Mean	22.12
Std Dev	24.32
Std Err Mean	4.96
Upper 95% MN	11.85
N	24
Median	17.5

Figure 7: Number of Organizations on LEPC

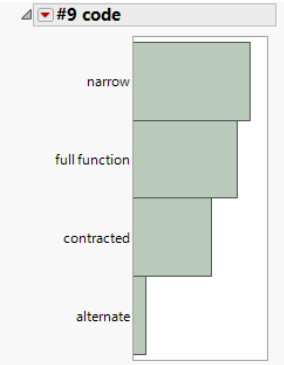
Question Q8 requested information regarding consistent participation by agencies involved in the LEPC or similar committees. Close to half of counties reporting had consistent and active participation which does demonstrate a commitment and increase networking opportunities between members. However, 21% of respondents lacked any consistency, which is close to a quarter of counties without an active connection between EMC's and community organizations in an organized fashion (Table C).

Table C: Consistency of Organizations Participating on the LEPC

	# of counties	%
No consistency	5	21
Limited consistency	2	8
Core group all in	6	25
All members active	11	46

Question Q9 inquired about the level of involvement the LEPC has in developing the local emergency plans. Because the committee is expected to encompass a range of public and private agencies, high involvement levels would incorporate voices from a broader array of groups, allowing for more complete community representation. The survey found a range of responses as shown in Table A (pg. 66). Thirty three percent of counties did have an active responsibility in reviewing the county emergency plans. Thirty-seven percent of counties had the LEPC tackle a very narrowly defined task which ranged from only focusing on the hazardous materials aspect of the plan to a cursory overview of the plan prior to approval. Thirty-five percent of counties used contractors to develop the county emergency plan and did not involve the LEPC beyond cursory review upon completion (Figure 8). The results of this question do challenge the viability of the LEPC in impacting the emergency plan developed for many communities across the state. One finding that emerged was that there is a statistically significant correlation between the frequency of LEPC meetings and the level of involvement of LEPC in CEMP. Those counties that have an active LEPC also have an LEPC involved in the development of the CEMP (Table D). The causal direction of this relationship remains uncertain.

Figure 8: Level of Involvement of LEPC in CEMP



Frequencies

Level	Count	Percent
Alternate	1	4%
Contracted	6	25%
Full Function	8	33%
Narrow	9	37%

Table D: Level of LEPC involvement compared with how often LEPC meets

How often LEPC meet

#9 code	Count Total % Col % Row %	0	1	2	3	4	Total
alternate		0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 4.17 20.00 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 4.17
contracted		3 12.50 100.00 50.00	1 4.17 14.29 16.67	0 0.00 0.00 0.00	1 4.17 16.67 16.67	1 4.17 33.33 16.67	6 25.00
full function		0 0.00 0.00 0.00	1 4.17 14.29 12.50	3 12.50 60.00 37.50	2 8.33 33.33 25.00	2 8.33 66.67 25.00	8 33.33
narrow		0 0.00 0.00 0.00	5 20.83 71.43 55.56	1 4.17 20.00 11.11	3 12.50 50.00 33.33	0 0.00 0.00 0.00	9 37.50
Total		3 12.50	7 29.17	5 20.83	6 25.00	3 12.50	24

LEPC Meeting Frequency Key
0 = none
1 = annual or bi-annual meeting
2 = quarterly
3 = bi-monthly
4 = monthly

Tests:

N	DF
24	12

Fisher's Exact Test **0.044** p value

Question Q10 asked for an example of community involvement in developing the CEMP. Answers range from hosting town hall meetings for community data to including local colleges and industry as plans are updated. One community captured a range of perspectives as an evacuation plan was updated. One community maintained an advisory group to identify access and function of police, fire and human services. Eight counties did not provide a specific example. Five counties used sub-committees of the LEPCs.

Findings for Research Question #1 that states an involved LEPC will increase an EMC's contact with community organizations and therefore increase community network strength

1. 100% of counties interviewed have a full-time staff on hand for emergency services coordination. The median staff size for rural counties was two full-time staff and urban counties grew to a median of three staff. The mean staff size across all counties was 2.4 staff.
2. The communication pathways within each county included a consistent, but wide range of local and state resources for initial responses. All counties had agencies and organizations aligned for planning and response, however, beyond fire, police, and department of transportation, the order of contact and scope of organizations used varied without a pattern emerging.
3. When community members were included in communication avenues, LEPC committees were popular tools in use; however, they were not the only pathways found. Specific counties also used town hall meetings or community advisory groups beyond the sub-committee structure within the LEPC.
4. Most common size of the LEPC was 17-20 organizations including both governmental agencies and community organizations. This is regardless of county size or population density. The organizations involved were diverse beyond the core emergency service group and utilities, which demonstrates a commitment to developing a committee that serves the specific community when the LEPC is utilized.

5. When considering the frequency of LEPC meetings held in the county, there is a significant difference in the rural and urban population density of the counties (n=24, Fisher's Exact Test = 0.03). The rural counties utilized the LEPC with more frequency.
6. The relationship between frequency of LEPC meetings and degree of LEPC use in planning is statistically significant (n=24, Fisher's exact test = 0.044). This is logical as higher meeting frequency would suggest that the LEPC is an active instrument used for planning and communication.

Research Question #2

Research question 2 considered the leadership of the Emergency Coordinator both internally and externally to the LEPC as a potential variable impacting community emergency planning and response success. Survey questions Q9-17and 19 apply directly to R2.

Question Q11 was about community involvement in the hazard assessment process, an element of the LEPC's original charge. There was quite an even split between counties that had no community involvement and those that were highly involved in the process. No categorical sorting showed any significant correlation. 53% had low to moderate involvement and 45% high level of involvement (Table E). Table F compares level of community involvement with frequency of LEPC meetings and shows no significant correlation.

Table E: Community Involvement by Region and Rural/Urban counties

Regional District

#11 code

Emergency Region	Count / Total % / Col % / Row %	low	medium	high	Total
cap		2	2	1	5
		8.33	8.33	4.17	20.83
		25.00	40.00	9.09	
		40.00	40.00	20.00	
cen		2	1	1	4
		8.33	4.17	4.17	16.67
		25.00	20.00	9.09	
		50.00	25.00	25.00	
fin		0	0	4	4
		0.00	0.00	16.67	16.67
		0.00	0.00	36.36	
		0.00	0.00	100.00	
nor		2	0	1	3
		8.33	0.00	4.17	12.50
		25.00	0.00	9.09	
		66.67	0.00	33.33	
sou		1	1	2	4
		4.17	4.17	8.33	16.67
		12.50	20.00	18.18	
		25.00	25.00	50.00	
wes		1	1	2	4
		4.17	4.17	8.33	16.67
		12.50	20.00	18.18	
		25.00	25.00	50.00	
Total		8	5	11	24
		33.33	20.83	45.83	

N	DF	Fisher's Exact Test
24	10	0.63 p value

Rural and Urban Counties

#11 code

Pop Category	Count / Total % / Col % / Row %	low	medium	high	Total
rural		7	2	8	17
		29.17	8.33	33.33	70.83
		87.50	40.00	72.73	
		41.18	11.76	47.06	
urban		1	3	3	7
		4.17	12.50	12.50	29.17
		12.50	60.00	27.27	
		14.29	42.86	42.86	
Total		8	5	11	24
		33.33	20.83	45.83	

N	DF	
24	2	
Fisher's Exact Test	0.23	p value

Table F: Community Involvement by frequency of LEPC meeting

Contingency Table

How often LEPC meet

#11 code	Count / Total % / Col % / Row %	0	1	2	3	4	Total
low		1	2	2	2	1	8
		4.17	8.33	8.33	8.33	4.17	33.33
		33.33	28.57	40.00	33.33	33.33	
		12.50	25.00	25.00	25.00	12.50	
medium		1	1	1	1	1	5
		4.17	4.17	4.17	4.17	4.17	20.83
		33.33	14.29	20.00	16.67	33.33	
		20.00	20.00	20.00	20.00	20.00	
high		1	4	2	3	1	11
		4.17	16.67	8.33	12.50	4.17	45.83
		33.33	57.14	40.00	50.00	33.33	
		9.09	36.36	18.18	27.27	9.09	
Total		3	7	5	6	3	24
		12.50	29.17	20.83	25.00	12.50	

N	DF	
24	8	
Fisher's Exact Test	1.00	p value

LEPC Meeting Frequency Key
0 = none
1 = annual or bi-annual meeting
2 = quarterly
3 = bi-monthly
4 = monthly

Question Q12 considered the response capacity of a community beyond the local, county and state agencies. Results by emergency region, population density and disaster numbers are below (Table G). No significant difference was found across groupings. 54% overall did not have any clear plan for community response beyond available governmental agencies. 29% did utilize the LEPC as a structured pathway for community resources and 12.5% of counties had signed a memorandum of understanding (MOU) with neighboring counties for assistance.

Table G: Response Capacity of a Community by region and rural/urban counties:

Emergency Region

#12 code

Emergency Region	Count / Total % / Col % / Row %	fire	LEPC	MOU	none	Total
cap		0	2	0	3	5
		0.00	8.33	0.00	12.50	20.83
		0.00	28.57	0.00	23.08	
		0.00	40.00	0.00	60.00	
cen		1	1	0	2	4
		4.17	4.17	0.00	8.33	16.67
		100.00	14.29	0.00	15.38	
		25.00	25.00	0.00	50.00	
fin		0	0	0	4	4
		0.00	0.00	0.00	16.67	16.67
		0.00	0.00	0.00	30.77	
		0.00	0.00	0.00	100.00	
nor		0	2	1	0	3
		0.00	8.33	4.17	0.00	12.50
		0.00	28.57	33.33	0.00	
		0.00	66.67	33.33	0.00	
sou		0	0	1	3	4
		0.00	0.00	4.17	12.50	16.67
		0.00	0.00	33.33	23.08	
		0.00	0.00	25.00	75.00	
wes		0	2	1	1	4
		0.00	8.33	4.17	4.17	16.67
		0.00	28.57	33.33	7.69	
		0.00	50.00	25.00	25.00	
Total		1	7	3	13	24
		4.17	29.17	12.50	54.17	

N DF
24 15
Fisher's Exact Test 0.18 p value

Rural or Urban County

#12 code

Pop Category	Count / Total % / Col % / Row %	fire	LEPC	MOU	none	Total
rural		1	6	2	8	17
		4.17	25.00	8.33	33.33	70.83
		100.00	85.71	66.67	61.54	
		5.88	35.29	11.76	47.06	
urban		0	1	1	5	7
		0.00	4.17	4.17	20.83	29.17
		0.00	14.29	33.33	38.46	
		0.00	14.29	14.29	71.43	
Total		1	7	3	13	24
		4.17	29.17	12.50	54.17	

N DF
24 3
Fisher's Exact Test 0.78 p value

Question Q13 considered what external organizations are involved in developing the county response capacity and examples of these. 11 counties (46%) did not include external organizations or did not answer the question. 2 counties contracted with outside agencies to aid in developing the response capacity. The remaining 11 counties (46%) included examples that ranged from fire department involvement to LEPC or other regional committee activity in planning, or the inclusion of community and businesses in the planning stages.

Question Q14 asked how the LEPC committee is coordinated by a person or persons. This information helps to inform what resource base is considered important in the work of the LEPC. Table H below displays the results. 54% of LEPC's sampled utilize the EMC as chairperson for the group with another 20% developing joint control between a chairperson from the public and the EMC. The trend, based on state analysis, is to follow the lead of the EMC, which increases alignment of priorities between the County EMC and the LEPC with its broad spectrum of community organizations represented.

Table H: Person in charge of organizing the LEPC

POA for 14	Pop Category		
Count Total %	rural	urban	Total
Chair	3 12.50	3 12.50	6 25.00
EMC	10 41.67	3 12.50	13 54.17
joint	4 16.67	1 4.17	5 20.83
Total	17 70.83	7 29.17	24

Tests

N	DF
24	2

Fisher's Exact Test 0.08 p value

Question Q15 on the survey followed up on organization participation by inquiring about commitment by involved organizations. Results are found in Table I. In this instance there is a strong distinction between the strong commitment found in rural communities (33%) and moderate commitment reported in the urban communities (12%).

Table I: Level of Commitment to Emergency Planning by local organizations

Level of comm	Pop Category		
Count Total %	rural	urban	Total
low	4 16.67	2 8.33	6 25.00
moderate	5 20.83	3 12.50	8 33.33
strong	8 33.33	2 8.33	10 41.67
Total	17 70.83	7 29.17	24

Tests:

N	DF	
24	2	
Fisher's Exact Test		0.08 p value

Question Q16 targeted what impacted the success of the county emergency plan implementation from the perspective of the EMC. The intent was to capture strong aspects of each county's implementation formats. The responses were tabulated into three categories: staff training, strength of the internal staff and operations, and relationships beyond the staff and organization. 71% of all counties emphasized networks and relationships as critical to successful implementation of the CEMP. 21% listed internal training as key, which raises the question of how important networking is within those counties (Table I and Table J).

Table J: What most impacts the success and engagement of the CEMP?

	Level	Count	Percentage
1 = Training as key to success	1	5	21%
2 = Internal strength of operations as key	2	2	8%
3 = Relationships across community as success	3	17	71%
	Total	24	100%

Table K: Most Impact on Success of CEMP.

16 imp

Pop Category	Count / Total % / Col % / Row %	1	2	3	Total
rural		3	1	13	17
		12.50	4.17	54.17	70.83
		60.00	50.00	76.47	
		17.65	5.88	76.47	
urban		2	1	4	7
		8.33	4.17	16.67	29.17
		40.00	50.00	23.53	
		28.57	14.29	57.14	
Total		5	2	17	24
		20.83	8.33	70.83	

Key
1 Training
2 Internal strengths
3 Relationships

Tests

N DF
24 2
Fisher's Exact Test 0.46 Prob<P

Question Q17 focused on hazardous materials spills and containment issues as this is a core aspect of the LEPC formation. All counties have active hazardous material teams or memoranda of understanding (MOUs) with neighboring counties to access equipment and staff. All mentioned Tier II reporting as mandated by the state. Funding for Hazardous Materials handling has decreased, so all are stressed about the impact of that on their ability to respond to a crisis. LEPC is an active participant in this portion of the county plan, or there is a list of business contacts to use in a hazardous materials situation in all counties surveyed.

Question Q19 focused on the awareness of EMCs regarding local businesses and any emergency preparedness plans they would have in place. Required Tier II reporting was the baseline response. Fifty-four percent of counties had a degree of emergency plans beyond what was expected for Tier II reporting. Involvement of local businesses was noted, but varied. Better than the 21% with minimal, Tier II reporting only, but far from the 25% that reported very active emergency plan development by community businesses (Tables L and M).

Table L: EMC emergency plan awareness

Emergency Region	Count / Total % / Col % / Row %	19 code 1	2	3	Total
cap		1	2	2	5
		4.17	8.33	8.33	20.83
		20.00	15.38	33.33	
		20.00	40.00	40.00	
cen		2	1	1	4
		8.33	4.17	4.17	16.67
		40.00	7.69	16.67	
		50.00	25.00	25.00	
fin		0	3	1	4
		0.00	12.50	4.17	16.67
		0.00	23.08	16.67	
		0.00	75.00	25.00	
nor		2	1	0	3
		8.33	4.17	0.00	12.50
		40.00	7.69	0.00	
		66.67	33.33	0.00	
sou		0	4	0	4
		0.00	16.67	0.00	16.67
		0.00	30.77	0.00	
		0.00	100.00	0.00	
wes		0	2	2	4
		0.00	8.33	8.33	16.67
		0.00	15.38	33.33	
		0.00	50.00	50.00	
Total		5	13	6	24
		20.83	54.17	25.00	

N DF
24 10
Fisher's Exact Test 0.30 Two sided P

Pop Category	Count / Total % / Col % / Row %	19 code 1	2	3	Total
rural		5	9	3	17
		20.83	37.50	12.50	70.83
		100.00	69.23	50.00	
		29.41	52.94	17.65	
urban		0	4	3	7
		0.00	16.67	12.50	29.17
		0.00	30.77	50.00	
		0.00	57.14	42.86	
Total		5	13	6	24
		20.83	54.17	25.00	

N DF
24 2
Fisher's Exact Test 0.25 Two sided P

KEY: (19 code)

1 = no, not aware
2 = aware, but minimal details
3 = fully active and involved with details

Table M: EMC emergency plan awareness by LEPC meeting frequency

19 code	Count / Total % / Col % / Row %	How often LEPC meet 0	1	2	3	4	Total
1		0	2	1	2	0	5
		0.00	8.33	4.17	8.33	0.00	20.83
		0.00	28.57	20.00	33.33	0.00	
		0.00	40.00	20.00	40.00	0.00	
2		1	4	2	4	2	13
		4.17	16.67	8.33	16.67	8.33	54.17
		33.33	57.14	40.00	66.67	66.67	
		7.69	30.77	15.38	30.77	15.38	
3		2	1	2	0	1	6
		8.33	4.17	8.33	0.00	4.17	25.00
		66.67	14.29	40.00	0.00	33.33	
		33.33	16.67	33.33	0.00	16.67	
Total		3	7	5	6	3	24
		12.50	29.17	20.83	25.00	12.50	

KEY: LEPC Meeting Frequency
0 = none
1 = annual or bi-annual meeting
2 = quarterly
3 = bi-monthly
4 = monthly
KEY: (19 code)

1 = no, not aware
2 = aware, but minimal details
3 = fully active and involved with details

N DF
24 8
Fisher's Exact Test 0.61 Two sided P

Findings for Research Question R2

1. The results of question Q12 challenge the effectiveness of the LEPC in impacting the emergency plan developed for many communities across the state. While the LEPC was found to be helpful as a communication tool, it was not consistently used in the development of CEMPs.
2. The EMC staff person is also the LEPC chairperson in over half of the counties interviewed. This does maintain alignment with emergency planning staff, but may also limit creativity and challenging the status quo.
3. Rural communities demonstrate more consistent commitment by community organizations to the LEPC then the urban communities (33% rural and 12% urban). This could be due to a smaller list of organizations in the rural areas and a much broader array of community stakeholders in an urban setting.
4. Networking and relationship development are key aspects of the LEPC committee structure. Seventy-percent of responding EMCs cited relationships as critical to success and they attributed the LEPC and its intersection of agency, business, and government interests as part of network development success.
5. The New York State mandates for hazardous materials planning are working to establish a baseline in reporting at the county level. All counties noted Tier II hazardous materials reporting in any questions regarding planning, but did not use the LEPC in every case.

Research Question #3

Research Question 3 considered the activity of a CART in the county to meet the demand for non-human recovery in an emergency situation. Question Q18 requests the status of a

Confined Animal Response Team (CART) in the county. Several counties (42%) have CART teams in place while others have MOU's with neighboring counties (8%) (Table N and Figure 8). There was an equal number of available teams in rural and urban counties. The urban units had additional numbers of small animal cages available in case of flooding or other issues of displaced pets.

Table N: County Animal Response Team availability

Pop Category

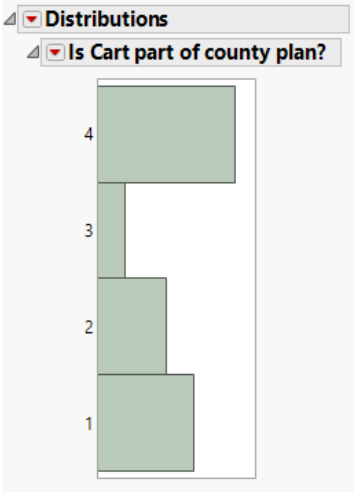
Is Cart part of county plan?	rural	urban	Total
Count			
Total %			
Col %			
Row %			
1	6	1	7
	25.00	4.17	29.17
	35.29	14.29	
	85.71	14.29	
2	3	2	5
	12.50	8.33	20.83
	17.65	28.57	
	60.00	40.00	
3	1	1	2
	4.17	4.17	8.33
	5.88	14.29	
	50.00	50.00	
4	7	3	10
	29.17	12.50	41.67
	41.18	42.86	
	70.00	30.00	
Total	17	7	24
	70.83	29.17	

Frequencies:

Level	Count	Percentage
1	7	29%
2	5	21%
3	2	8%
4	10	42%
Total	24	100%

N	DF
24	3

Fisher's Exact Test 0.67 p value



1 = no CART plan
2 = Paper only, no active development
3 = MOU with neighboring county
4 = Active CART trailer and system in place

Figure 9: CART activity distribution

Findings Research Question R3

1. While the rural communities tend to be more active on the LEPC as noted in Findings for Research Question 2, the CART team question demonstrated a keen interest in small animal welfare by the urban counties interviewed as well as the rural county interest in both small and large animals.
2. Half of counties interviewed did not have a functional CART plan for animal welfare. The other 50% did have an active trailer or MOU's. Active trailer units were in 29% of rural counties and 12.5% urban counties while MOU's were even at 4% in both rural and urban counties. This fails to support the research question as written.

Research Question R4

Research Question 4 considered how NY EDEN connected to county-level emergency planning. Question Q21 asked about familiarity with NY EDEN as a resource for emergency planning. 33% expressed a degree of awareness but only two counties' emergency planners actively interacted with NY EDEN via Extension Association involvement. The remaining six counties had heard of the program but that was the extent of the knowledge. 67% of counties responding had no awareness of the program (Table O). NY EDEN was established to help with educating the public about being prepared for emergencies. This goal may not directly intersect the emergency planning that a county EMC is involved with, however, both are directed at the safety and strength of the community and its residents. A degree of alignment and awareness seems to be of mutual benefit.

Table O: NY EDEN Familiarity

Level	Count	Probability
1 (NO)	16	67%
2 (YES)	8	33%
Total	24	100%

Findings for Research Question #4:

1. NY EDEN is underserving its target population.
2. EMC's and NY EDEN are not intersecting within the emergency management network to allow for coordination of resources and information.

Research Question R5:

Research question 5 considered the use of private resources as part of the county emergency plans (CEMPs). Question Q20 considered if there are any specific resource or inventory lists that communities can access during an emergency (Table P). The resource lists available were often tied to county highway transportation departments and town or village equipment. This included excavators, trucks, bulldozers, trailers, pumps, generators, etc. There are private companies, especially in rural areas, which have these same resources. The issue surfaced during interview pilot questions. A local operator owned equipment that could be used in an emergency, but was unaware of any plan to reach out to privately owned resources in the case of a disaster that overwhelmed agency resources. EMCs accessing resources farther out into the community were rare, although one county did have specific MOUs with an excavation contractor for use of his equipment if needed.

Table P: Community Inventory Lists Available

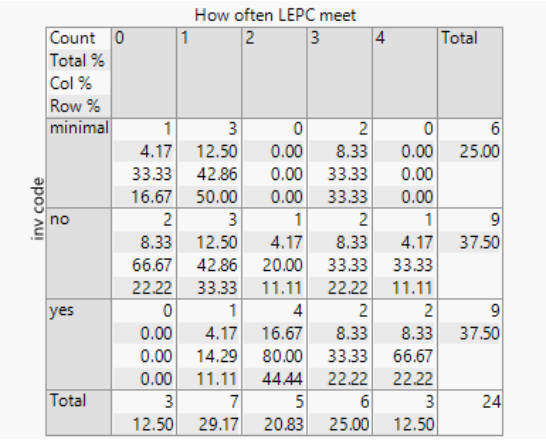
Frequencies:

	Minimal	No	Yes	Total%
Rural	17	29	25	71
Urban	8	8	12	29

N	DF
24	2

Fisher's Test 1.0 p value

Table Q: Community Inventory Lists correlated with LEPC frequencies



How often LEPC meet

inv code	Count / Total % / Col % / Row %	0	1	2	3	4	Total
	minimal	1	3	0	2	0	6
		4.17	12.50	0.00	8.33	0.00	25.00
		33.33	42.86	0.00	33.33	0.00	
		16.67	50.00	0.00	33.33	0.00	
	no	2	3	1	2	1	9
		8.33	12.50	4.17	8.33	4.17	37.50
		66.67	42.86	20.00	33.33	33.33	
		22.22	33.33	11.11	22.22	11.11	
	yes	0	1	4	2	2	9
		0.00	4.17	16.67	8.33	8.33	37.50
		0.00	14.29	80.00	33.33	66.67	
		0.00	11.11	44.44	22.22	22.22	
	Total	3	7	5	6	3	24
		12.50	29.17	20.83	25.00	12.50	

N	DF
24	8

Fisher's Exact Test 0.37 p value

Question Q22 looked at any local resources used in the case of severe weather. 50% of counties said no plans were available for an organized method to secure resources that are not contacted by a government agency. Thirty-seven percent of counties responding did feel they had access to local, private, resources, but the specifics were very dependent on the agency in charge of that incident. Twelve percent of counties simply defer to their community fire departments for local resource allocation (Table Q). Further discussion noted that liability risk limited direct use of private resources. The counties did not want to open themselves to that exposure, so they limited planning to local, regional and state resources.

Findings for Research Question 5

1. Private resources are not commonly factored into emergency preparedness. There is a culture of relying on local, state and federal government resources rather that develop agreements with private or community resources.

Community Member Interview

A secondary data source used was a community representative in the counties that had Emergency Coordinators contacted. The two populations used to gather interview data were current County Farm Bureau Board presidents and agriculture educators within each county. The argument for using these two groups is their strong connection to agriculture and awareness of the broader community spectrum in most cases. Data capture was very light in this area with only six responses to both email and phone solicitation. As a result, these findings can only be considered suggestive. Personal contact was the best way to capture data. However, that was limited due to travel budgets and scheduling. The intent of capturing the 9 questions asked of the community members was to provide a sense of if the well networked community members had a general understanding of emergency preparedness for the county. This acts as a check on the responses of the EMCs, and gives a perspective regarding how well the community is informed about emergency status.

Response Data

The first question asked how many years the participant has lived in the county. The range started at 15 years and hit 44 years at the top of the scale. Average years in the county was 34 years in the community.

The second question asked about part-time or full-time coordinators. Full -time coordinators were reported in all counties.

The third question asked for specific knowledge regarding the LEPC or other mechanism to interact with the Emergency Coordinators. All agreed a mechanism was in place, but only one was sure it was the LEPC. The Board of Supervisors and Fire Departments were the other strong networking groups that interacted with the EMC.

The fourth question asked for key players in agriculture, or industry groups that would be a part of an emergency response. This excluded fire, police and the Red Cross as they were assumed to be the first responders. Key players in all cases included: Soil and Water Conservation, Cooperative Extension, Equipment Dealers, and Farm Bureau. One county found that the Board of Supervisors was very hands-on and Department of Environmental Conservation (DEC) or local Confined Animal Feedlot Operations (CAFO) planners have also been involved. One other county noted that the coordinator for the local CART team was also a very active member in emergency planning.

The fifth question targeted the level of preparedness for an emergency in each county. All participants noted a reasonable to very well-prepared status of readiness.

Question six inquired about their familiarity with emergency plans at the business level. All but one were aware of specific examples of emergency plans available at businesses in the community.

Question seven asked about knowledge of the CART team and question eight asked specifically about NY EDEN. Half the participants were familiar with CART while the other half was not. No one was familiar with NY EDEN in this small group.

The final question asked about their perception about communications pathways up and down the levels of government and emergency services in their county. All six responded with very favorable reviews of the county and town levels' ability to interact and communicate from the village up to at least the state level in times of emergency.

Findings from Community Interviews

1. NY EDEN is not readily visible to community members as well as the county EMCs.
2. The community perspective is that each county was reasonably prepared for an emergency and did have communication plans in place in terms of chain of command and interaction with the state.
3. County Legislators and fire departments are network points of contact between community members and EMCs.
4. Soil and Water Conservation, Cooperative Extension and Farm Bureau were mentioned specifically as agriculture contact points in time of emergency.

Comparison to State CEPA (County Emergency Preparedness Assessment) Data

Survey questions generated patterns in several areas that were compared with New York State Homeland Security CEPA data. The categories include:

1. The ability to develop, validate and maintain plans to identify threats and hazards. Questions 9 and 10 targeted this area and the counties were found to be strong in this

feature. Statewide data find planning just outside of the top tier of quality performance indicators. The broader issue is one of keeping the plans updated. The current research study found 25% of counties using contracted services to write or assist in plan development. That pattern is increasing statewide with select counties being very effective in the use of contractors, while others use it to make a plan and check the box with limited effort to implement the plan. The counties utilizing the contractors well leverage a well-defined plan and work to establish procedures to use in a disaster. (NYS Homeland Security, personal communication, January 20, 2015).

2. Public Information and Warning – coordinated delivery of alerts, prompt and actionable information to public. This topic surfaced in discussion of questions 12 and 16. Counties have strong emergency notification systems for the general population. The state-data support that overall position but also show a weakness in notification of vulnerable populations especially individuals without access to cell phones and internet or cable since they are not as likely to receive the warnings. Low-tech options within emergency plans are encouraged by the state, but they need continued development. State data show 25% of people in rural areas are elderly and seldom have easy access to current warning systems. Representatives of rural counties expressed a degree of self-sufficiency to both the state reports and current research interviews, yet all counties have a degree of underprivileged or elderly populations that will struggle in emergency situations. Emergency plans need to stipulate how these populations are engaged.
3. Citizen Awareness and Preparedness – ensuring citizens are fully aware, trained and practiced for response to an event. A specific question was not asked regarding this;

however, the topic did surface during discussion about LEPC activities and community involvement in emergency plan development as well as business emergency plan development (Q19/20A). Counties have strong emergency plans but are not involved in continual citizen awareness efforts. Counties noted efforts by the LEPC when funds were provided, but limited awareness efforts when funds were not provided. State CEPA patterns also place this issue as low on the scale of preparedness and allocation of resources. State-level experience also notes a degree of finger pointing where no particular group owns this category. Multiple groups should be working towards awareness and preparedness so no one group takes the lead. This is also evident at the National level.

4. Private Sector/NGO Coordination – coordinate with private sector and NGOs to leverage their resources. Interview questions 12, 20 and 22 targeted this category. Counties relied heavily on county agencies or state agencies for resources. Red Cross was included early in disaster situations, with utilities and mental health in close proximity, but NGOs and private businesses were not a part of 83% of county emergency plans. In many cases, counties would reach out to private individuals if county resources were depleted, but this was on a case-by-case basis and not factored into formal planning documents. State-level data identified Red Cross, Utilities and hospitals/public health as key NGO/private sector networks that counties use. This aligns with the current research data as well. Both state and current research data display a strong ad-hoc network of agreements and exchanges where key players are brought in to help with an event as needed, based on an existing relationship.

5. Firefighting and support operations – coordinate fire suppression and mutual aid. Survey questions 11, 12 and 16 approached this category although not directly. Community fire departments were identified by 100% of counties as key elements to community information disbursement and access to needed equipment due to grants awarded to various departments. This category was very strong in all counties sampled. State CEPA data list this as the #1 capacity across all county emergency plans. They are well resourced, trained and active, an important action and network resource for emergency managers. However, a growing problem is the current shortage of volunteers for many rural departments. Equipment may be at the ready but manpower is in short supply, causing strain on this important community resource (Cortland Standard).
6. Transportation – restoration of transportation systems. A survey question did not directly address this, but in discussion of the emergency plans and Q5, agencies working within a real time emergency, State DOT and town highway departments were at the top of the list to ensure roads were open and repaired so goods and people could move across the counties. State data support this response. Many communities have standing MOUs across state, county and local transportation and public works departments so the interactions are existing and communication is strong on a daily basis. Calling this structure to task during an event is fast and responsive due to that familiarity and knowledge of asset strength and reserves.
7. Recovery and Mitigation – build resilient systems and provide support for rebuilding after the event. This varied depending upon the emergency coordinator and the focus

we took during the interview. If a recent event had occurred, recovery and mitigation were at the forefront of the planning review; if an event was becoming distant, less emphasis on developing recovery and mitigation was observed. State CEPA data find that federal funds or mandates increase focus on recovery or mitigation but beyond that, it is often not a strong part of county plans. State data points to a tension between resilience and mitigation. A community works to rebuild a road as soon as possible after an event, rather than spend more time developing a mitigation plan that will use more time and resources but prevent the issue from happening again. The delayed gratification/completion is a challenge to have counties agree to when planning or recovering.

Emergency Preparedness at the National Level

A 2008 survey of LEPC use by the Office of Emergency Management (OEM) within the EPA found several items of note in relation to the current study. The study had a 40% response rate and the Northeast was under-represented; however, there are items of interest in comparison with the information captured in this study.

1. Less than 70% of respondents had community group involvement in their LEPC.
2. Less than fifty percent had general public involvement of any kind in the LEPC and related planning efforts.
3. Eighty percent of counties did have a “call down list” for emergency contacts.
4. Ninety percent of counties included protocols for informing the public in emergencies.

5. Fifty nine percent listed their notification mechanism as newspapers.
6. Only twenty three percent of counties have websites for emergency management.
7. Forty six percent did use a Citizen Corp Council representative that is analogous to the LEPC.
8. Fifty nine percent of counties did not have a budget for the LEPC.
9. The size and consistent participation of LEPC members is observed as a factor of success.

Findings from comparing National LEPC data to State trends and interview results

1. New York State LEPCs have a more active community element in all counties where the LEPC is active as indicated by the mix of organizations noted in interview responses and aligned with state trend discussions.
2. The national and state-level patterns are towards minimal direct, general public involvement in the LEPC or other planning efforts. The general public is expected to be represented by the community organizations invited to the table.
3. Communication methods used to distribute emergency notices tend to be very basic, from a call list to newspaper notifications. New York counties included cell phone text messages, but access to at-risk populations is limited across the nation. A 23% website use for emergency management is very small given the current trend towards information access via the internet.
4. New York is ahead of the country in LEPC or Citizen Corps use (75% vs 46%) although all states have the same issue of limited to non-existent funding for the committee structure.

5. The current study agrees with the national survey regarding size and meeting frequency as strong determinants of success with the LEPC.
6. The current research finds urban counties more tuned-in to community involvement than rural ones. Rural communities are more likely to just solve the problem, very slow to ask for assistance – a bit more prepared to be creative and make things work. State data agree with that statement.
7. EMCs rely heavily on local DOT for solutions and have limited engagement with private individuals beyond LEPC. Exceptions occur when large manufacturers or colleges are members of the community.
8. EMCs considered relationships/networks to be the most important element to success, however not all EMCs used LEPCs to create the networks.
9. State data finds coordinators that are outgoing and work at developing network connections are more successful than those coordinators that struggle more with working across multiple personalities and resource managers. This pattern also relates to the growth of professional emergency management positions. Training and personal attributes may be shown to impact the success of the county emergency planning department due to the small size and limited employment in each county.

Hypothesis Statements and Discussion

The Null statement for Hypothesis One (H1) is that New York Counties demonstrate one level of consistent involvement and commitment to LEPC use across the state. Interview questions 6, 7, 8 and 11 relate specifically to LEPC activity and involvement. Q6 captured how often meetings were held in each county. The range started at no meetings for three

counties to three counties that met bi-weekly. Each end of the spectrum (none and bi-weekly) captured 12% of counties while annual, semi-annual and monthly all captured from 20 to 29% each. Activity was certainly present as the LEPC was utilized in all but three counties interviewed, but not in a uniform manner. No significant difference was found if categorized by urban/rural, emergency region or disasters recorded in the past 10 years. Upon closer consideration, this can be expected as each county must meet the needs of its constituents and not simply follow a mandated protocol. There were additional factors noted in the interviews: EMCs did note that funding for LEPCs had been cut or narrowed to specific hazardous materials focus. Counties had to step in and fund the committees if broad-spectrum use was to continue. Question 9 took the discussion one step further and captured the breadth of focus for each LEPC in relation to county emergency plan development. The resulting spectrum ranged from no LEPC input; a contracted CEMP developer; or a full review of the CEMP by the LEPC. There was a 33% response with full LEPC review, 25% using contractors, and a 37% response using a narrow review of CEMPs typically focusing on the hazardous materials area. Hence, no clear distinction of how LEPCs were utilized across all categories considered. Question 11 targets the community involvement in the hazard assessment process via the LEPC. Hazardous Materials is one of the original targets of the LEPC and a reason for its initial funding. The counties were evenly split between those that did not have community involvement in hazard assessment and those that highly involved the community (33% low, 21% medium and 46% high involvement).

Given the analysis as noted above, the null hypothesis is rejected as no clear and consistent level of LEPC use can be identified across the counties sampled. Therefore the hypothesis that there is a spectrum of involvement and commitment levels by county LEPC's to assist in emergency planning is supported within the constraints of the small sample and questions that were asked. Specific data points can be considered as support for the varied nature of involvement and use of LEPCs. The data and pattern analysis support the hypothesis that stemmed from anecdotal evidence at the state level. Granted the sample size is small, but the diverse range of responses could be argued as a strength as each community is working to find a successful way to engage in emergency planning. State mandates are intended to provide a baseline of quality and counties are certainly interpreting the mandates in multiple forms. In qualitative interviews, emergency management coordinators noted plans were in place and spoke confidently about the networks and systems they utilized, regardless of size and scope. There was consistency in the EMC approaches and perception of questions asked in the interviews.

The second hypothesis statement reads: H2: Rural communities demonstrate more involved use of LEPC's in emergency planning than urban and suburban counties. When Emergency Management Coordinator demographics are analyzed by rural vs urban counties, no statistical significance is found across the three variables collected: years in the position, number of staff and full or part-time. LEPC activity does show significant ($p = 0.04$) correlation between the level of involvement in planning the CEMP and frequency of meetings (Table F). There is also significance (0.03) in the interaction between rural and urban counties when compared to the frequency with which the LEPC meets. Rural counties meet more often than

urban counties using their LEPCs. The categories analyzed include: how often LEPC meet, number of organizations on the LEPC, the LEPC being included in the county emergency plan, and who chairs the LEPC. One notable point of differentiation was found in an urban county that invited over 100 community organizations to its LEPC meetings. This is far beyond the typical 17-20 organizations in all other counties, rural or urban. The discussion does raise a question about other large urban areas, but, unfortunately, response rate in the larger urban areas was not as strong as rural EMCs. This would be an area for further study.

One aspect that had potential to differentiate the rural and urban counties is the use of a County Animal Response Team (CART). Question 19 asked if the county had an active CART or other response process for emergency situations involving non-humans. One county did respond with an alternative plan as they were close enough to Cornell University that the plan involved active agreements for the University to send veterinary students and equipment if needed in an event. The remaining counties were split in their CART efforts (Table N). Fifty percent of counties did not have a CART plan in place meaning no plan at all or 20% had a plan on paper but no effective means of putting it into action. In the 50% that did have plans in place, 42% of counties had plans in place and trailers or equipment readily available. 8% of the counties had memorandums of agreement with neighboring counties to use their equipment and facilities if the need arose. 70% of the active counties were in rural areas, as might be expected, however, several urban counties (12.5%) had active plans and resources in place to handle pets in a time of distress. While there were differences in how counties worked with the CART operations, there was not a significant difference between urban and rural perspectives or emergency regions or disaster numbers. Therefore, the null hypothesis that

rural and urban counties demonstrate an equivalent use the LEPC or equivalent in emergency planning procedures is supported given the current data set.

Qualitative Results

The nature of the structured interview questions did limit depth of responses for questions; however, there were opportunities to ask for clarification or further pursue responses that were unusual as compared to their peers. Three counties specifically took time to go much farther in depth in responses to most interview questions. This provides the basis for a more qualitative line of analysis and discussion. State-level qualitative data was not available so general patterns contribute to the qualitative depth of analysis.

Two counties specified table top exercises with their LEPC to prepare community networks for an incident, certainly the intent of the committee. Other counties may also include the LEPC in such exercises but did not stipulate that in the interview. Three counties do not have an active LEPC. One county did not have a formal mechanism to connect community organizations to the emergency coordinator's infrastructure while the other two had committees that were not considered an LEPC and had a broader charge related to community interaction. Volunteer firefighters surfaced time and again as the direct contact for emergency coordinators to local resources. There were four formal agreements for shared resources with local businesses, but one call to a local fire chief and the appropriate person would be called. While local legislators bear some of the responsibility to communicate with locals, the fire department does seem to be the go-to source for action steps within smaller communities. Three counties dealt with local resources on a case-by-case basis and two

counties relied on their own resources and did not include private individuals or organizations in the planning/implementation.

During the interview process an in-depth discussion developed with two distinct counties. One county is quite small and rural while the second county is slightly larger in land mass but a much more densely populated county with suburban elements feeding into a neighboring city and a very active commercial infrastructure. Both counties have very active LEPC structures and went well beyond the hazardous materials focus of the original LEPC design. Each county used a monthly LEPC meeting. The larger county had 120 organizations on the active participation list while the smaller county had 25 organizations. Not all attended of the 120 however, at least 20 met monthly in the smaller county. Both LEPCs were used as a networking hub to keep communication pathways open between government agencies and community agencies and organizations. The larger county had an independent LEPC Chairperson that works in coordination with the EMC while the smaller county had EMC staff coordinate and run the LEPC meetings. Both meetings sounded very similar in nature and focus. Both serve as an important pathway for communication across community partners and businesses.

CHAPTER 5

DISCUSSION OF FINDINGS

Review of Research Questions and Hypothesis

The overarching question that guides this study focuses on efforts by upstate NY counties to utilize the LEPC as a tool to develop strong communication networks that enable

effective emergency responses to potential disasters. Two hypotheses guide the study elements: H1: There is a spectrum of involvement and commitment levels by county LEPCs to assist in emergency planning and H2: Rural communities demonstrate more involved use of LEPCs in emergency planning than urban and suburban counties. The interviews of county emergency managers and community members targeted the research questions as noted in Figure 2, pg. 38.

Discussion of Findings

Discussion will focus around five areas of interest. A. Research questions as they inform the two hypotheses, B. An overall trend analysis of the data in comparison to that found at the state and national level, C. How does the data inform the resource mobilization aspect of the model put forth by Norris et al. (2008), D. Aligning the study findings with the Bowman and Parsons (2009) study that helped encourage the current research, and E. Summarize how this study informs the efforts by upstate NY counties to utilize the LEPC as a tool to develop strong communication networks that enable effective emergency responses to disasters.

A. Research Questions supporting Hypothesis H1

The first hypothesis, H1, stipulates that there is a spectrum of involvement and commitment levels by county LEPCs to assist in emergency planning. This was supported by the findings described in chapter four and reinforced in the literature. Zobel (2011) built upon research in resilience to develop a resilience triangle. The triangle stemmed from an equation where the quality of a system's infrastructure interacting with a measure of the robustness of the same system produces a factor that represents the rapidity of recovery (Zobel, 2011, p.

395). This quantifies the need for a flexible variable in determining resiliency. An EMC can use existing knowledge about past events and community readiness to influence decisions and results. This flexible variable was part of the underlying equation to generate the measure of infrastructure quality. Such a model was much more responsive to variations from one system to another and was able to factor in the coordinator's experience. Wise (2006) argues that the hierarchical model used in command and control systems fails where responses demand innovation in the tasks and assignments. A network model is more reactive to the changing variables of disaster events (Wise, 2006, pg. 311). Research Question 1 (RQ1) states that a full and involved LEPC at the county level will increase emergency management staff contact with community organizations and increase the strength of county communication networks. RQ1 findings noted in chapter four provide evidence that LEPCs are not the only tool used by counties, aligning with the network model of Wise. The EMCs are being creative and finding a solution that works. The LEPC is an available tool for a solution, however, the EMC has a range of options available depending on experience and network of the staff.

The frequency of LEPC meeting in rural areas was significantly greater than in urban areas, but the meetings were still often only once or twice a year. The degree of planning and active involvement decrease with only two meetings per year based simply on contact hours. In addition, 21% of respondents lack consistent participation. When the LEPC met semi-monthly or monthly the committee had a much broader function in planning and implementation. Counties investing time in the LEPC are seeing results; however, only 37% of counties reported commitment to that level of effort.

The LEPC is not specifically providing an increase in strength of community networks. Given that, one recommendation is to remove the mandate requiring an LEPC in New York and reframe using a recommended strategy that can be adapted by each county. The LEPC is a simpler capture point in state level data, but it is not effective in describing the variation found across counties. Increased flexibility in implementation would allow EMCs to better adapt to the changing needs of the county as discussed by Wise and Zobel.

Research Question 2 focuses on the issue of having the EMC as LEPC chairperson in over half of counties that responded. An EMC as chairperson is convenient and may streamline accountability of the LEPC. In contrast, leadership from the LEPC ranks could provide a second perspective in developing goals and strategies for the committee. Community perspectives could aid in innovative concepts and innovative responses. One county interview was with an LEPC chairperson. While they were fully aware and invested in emergency operation knowledge, they did provide a perspective that was different in tone and scope from the counties that had their EMC as LEPC chairperson at the same time. Beyond the one county with an active LEPC chair separate from the EMC, all other counties responding present a picture that places the EMC as the central point in the county communication network. EMCs were supportive of their LEPC and the work completed, but the EMC was the key element in county networks in a disaster. One recommendation built upon this study is to better support county EMCs with county and state funding to ensure a robust network of organizations and strategies to deal with disasters. Yes, this is their job; however, the job is changing and beginning to draw in professionals in emergency management rather than utilizing rank and file fire or police as they advance through their careers (Hastings, 2017). Ensuring dynamic staff in the EMC

position will strengthen the response network across counties. Seventy one percent of EMCs responded that the relationships across the community, often developed through the LEPC, were the most significant impact on the success of the CEMP. The LEPC is a factor but the EMC is developing the networks and management that leads to success.

The literature and the current study support the development of county emergency structures to specifically fit their community, as is currently happening and which many participants say they desire. Gharajedaghi presents a new category of variables in systems theory called transactional environment which includes all stakeholders within a system as potential influences upon the dynamics impacting an outcome (Gharajedaghi, 2011, p. 31). EMCs with active LEPCs have a mechanism to incorporate the influences of community stakeholders who can assist in determining the best plan of action in an emergency by taking a broader perspective into account. According to systems theory, the influencing elements, while small, can change the expected outcome of a situation. The response and recovery ability following a storm, for example, could hinge upon a small, interactive element within the system, immediate communication between two agencies, for example, so that a coordinated rescue is possible. The concepts put forth by Gharajedaghi also align with Malcom Gladwell's discussion of influences within a person's sphere of influence. The "tipping point" in a formula or interaction may be very small, but pivotal in its importance (Gladwell, 2002). The EMC works as a connector of many points of influence. One piece of information may allow for a faster or more accurate response to a disaster that strengthens a community response at a key moment.

Policy implications from this hypothesis include a state-level expectation for community involvement that continues to allow for the flexible implementation of guidelines such that

counties can customize the networks used to prepare and implement emergency plans. Counties that responded to this study were confident in the emergency plans in place and their organizational structures established to implement them. Community members shared that confidence but were very unsure of details. Continued efforts in community awareness should be supported at the county and state levels. Flynn (2007) builds a strong case for more national coordination of emergency planning to minimize the risk of communication breakdowns observed following hurricane Katrina in New Orleans. New York State has an active emergency coordination effort from the state level through to each county. All counties had access to a county command center with direct access to the state Office of Emergency Preparedness command bunker from there. State-level coordination is helpful, but there are limits to the extent of support that can be provided.

Counties develop their CEMPs with a certain level of disaster targeted, but what happens if the severity overwhelms the county preparedness level? Emergency response to Hurricane Sandy demonstrated elements of successful communication across emergency planning entities while also uncovering infrastructure weaknesses and the issue of communicating with at-risk populations as well as challenges in communication and organization across local, state and federal levels (Bucci, S. et al., 2017). An improvement was noted in comparison to responses to Katrina; however, weaknesses in the infrastructure and response coordination demonstrates room to improve at all levels. Fifty four percent of counties rely on local, county and state government agencies for action following a disaster. There was not a plan beyond that evident in discussions with EMCs outside of one county with an MOU extended to a local excavation contractor. This study finds a lack of response planning beyond internal agency resources and

recommends that counties explore opportunities to develop a clear plan of action for events that overwhelm established resources. Hurricane Sandy stretched New York thin in terms of recovery resources. Hurricane Harvey pushed Houston beyond the capacity of agency resources and saw a need for community-level responses as well. While this will hopefully be a rare occurrence, the amplitude of natural disasters is increasing such that the likelihood is increasing. A systematic plan to utilize private resources could have a large impact on the time it takes to recover from a severe weather event. This study found rural communities to have a degree of comfort with the concept of private citizen involvement, but no clear plan to organize those efforts. The situation is further complicated by the 46% of responding counties that develop the CEMP internal to the emergency management department and 8% that contract outside agencies to develop the plan. Comprehensive plans that do not involve public and private representatives from across the community are likely to draw on only a limited scope of resources. Finding a solution to liability issues that would allow communities to build private resources into the CEMP seems like a direct improvement to resilience both is speed and scope. A similar precedence is already found in Good Samaritan exclusions for doctors providing emergency care. Private Citizens helping in an emergency create a comparable case.

Research Questions supporting Hypothesis H2

The second hypothesis, H2, stipulated that rural communities used the LEPC as a path for more community involvement in emergency planning than urban communities. The findings in this study argue that the hypothesis is not supported. LEPC size, meeting frequency and interaction with the EMC was not differentiated across rural and urban communities with any

significance or consistency. Rural and urban counties utilize the LEPC in common ways to develop the community and agency networks with variations occurring to fit county needs.

There were counties that had developed communication pathways that served their community equal to or better than the LEPC format. The variations included two counties that utilized Chemical Hazard Information Team (CHIT) committees, others used local, unique partnerships ranging from the US Coast Guard to a Tribal Nation Council or the St Lawrence Seaway Administration, to the Soil and Water Conservation Service. The local interactions are targeted at the needs and mechanisms that are best suited for the EMC and community leaders. Grant funding streams also changed and had direct impact on several counties and their opportunities to continue the use of LEPCs especially since funding for LEPC use has diminished over time. State-level policies that expect community involvement while encouraging solutions that meet local needs are important in developing the networks that are responsive and deeply embedded from the local villages to the counties and directly to state personnel and resources. State-level leadership in the form of network support as explained by Wise (2006) provides the operational support that encourages local interaction and creative problem solving at much faster response time than if the federal level resources are expected.

If we consider social aspects of emergency preparedness as a lens to look at rural and urban differences, the similarities overwhelm the differences. Meyer-Emerick (2016) notes quite a range of common issues when identifying priority groups for emergency preparedness. Why do people not prepare? The most common response was a lack of experience with a disaster. Residents also perceive that it “won’t happen to me” or that the government will take care of them. The current study did find rural counties much more confident in their ability to

"solve the problems" on their own and often do not ask for help. Unfortunately, a disaster can quickly overwhelm local resources so a communication path had better be in place prior to the time when it is desperately needed. Both rural and urban communities need to develop a culture of preparedness, which requires a long-term focus. There is often an expectation for instant change, but this type of cultural shift is a slow progression (Meyer-Emerick, 2016). Following the floods in Schoharie County in 2011 a community response named Schoharie Area Long Term Development (SALT) was established to focus on emergency preparedness and planning across the community to maintain a resistance to future floods and have the resources to be resilient if flooding overwhelms initial plans (www.saltdevelopment.org).

The network model described by Wise (2007) also fits into the discussion of a lack of distinction between rural and urban networks. While he argues for a National Response Plan, the reality identified in his study is that FEMA and state emergency managers are embedded in a network of thousands of non-profit, private and state organizations and firms that will respond to a disaster. The bulk of that response network falls upon the state and local agencies for implementation. Each community has to develop a unique organization and implementation plan that works for them. That diversity is important, but not differentiated by rural and urban categories. Hence, the failure to support H2 in the current data. A recommendation stemming from the exploration of H2 is to support EMCs across the state continuing to share ideas for programming to develop resident preparedness and awareness. There are differences across rural and urban communities in upstate New York, but the similarities and proximity to each other support a united front in developmental needs.

CART

The County Animal Response Team (CART) question was included as a measure of how invested counties were in supporting animal agriculture in their areas. Crop producers have challenges stemming from flooding as well, but animal agriculture tends to have a need for more immediate responses to save livestock from injury or death. The question in this study generated a much stronger response and interest in establishing rescue protocols for small animals in the urban areas than expected. Pets were included in the emergency plans for many urban counties. 50% of the counties interviewed did not have a CART plan. The interview did not delve into specifics as to why. There are counties that have smaller numbers of livestock than others, although pet populations might be more similar. The 50% of counties that did have a plan also had either a trailer available within the county with needed materials or an MOU with a neighboring county. According to Gimenez, Gimenez and May (2008) the equipment is certainly needed; trained volunteers to utilize the equipment are even more critical when trying to extricate an animal from a natural or man-made incident that has put stress on the animal. The interview question did assume that having a CART team and plan implied that the training that was partnered with the equipment grants was completed for members of the community as well. CART plans were noted in county CEMPs if the county had a CART available, either directly in the primary plan or more often as an addendum to the core plan. The community responses demonstrated a limited knowledge of the CART program as an emergency plan in the county. 50% of respondents were familiar with the CART concept and 50% were not. This limited response connects to the larger issue of limited community education and awareness of the emergency plans that have been established. Gimenez,

Gimenez and May (2008) build a case that the best strategy for animal rescue is built from the ground up, with the producers first, rather than dictated by a well-meaning first responder that may not have the experience needed to interact with the animal. Animal and even crop damage can be extensive in weather related disasters. While the human lives are certainly the first responsibility in emergency planning, a large animal population is certainly something to be aware of and have considered in planning for items such as flooding or snow/ice as the impacts could be deep financially and emotionally to the community. A recommendation based upon this research is to maintain the current CART resources, but invest in a state wide producer awareness campaign that creates the ground-up knowledge base of what resources are available and where. The producers are more likely to engage proactively for their livestock than first responders whose primary job is keeping human residents safe. New York Farm Bureau would be a key cooperator in such an effort with Cornell Cooperative Extension as a second possible partner. An information effort would align with the needs identified by Gimenez, Gemenez and May (2008) for producer generated responses and deepen the network of assistance to county EMCs.

NY EDEN

Emotional and physical needs of community members are certainly aspects of concern to county emergency planners, albeit at a secondary level, after primary services and safety are restored in a community. The goals of NY EDEN are to disseminate educational materials and training through the Cooperative Extension system to community residents (eden.cce.cornell.edu). Education about emergency planning and responses that a family can engage in would help ease the emotional and physical stress of families. While a worthwhile

goal, the implementation, at least as measured by awareness by EMCs, is lacking. NY EDEN is the Extension Disaster Emergency Network hosted by Cornell Cooperative Extension. The network is available across upstate New York in conjunction with each county Cooperative Extension office, but is not found in every county. Sixty-three percent of county Emergency Coordinators had not heard of the program. The dissemination of education materials and opportunities to community residents would work to alleviate the existing shortcomings of county emergency plans as noted in this study through the interviews and state level data. A third NY EDEN goal stipulates Cooperative Extension establishing partnerships to assist in disaster planning and recovery. This could be interpreted to include aligning with the EMCs, but that seems very dependent on the individual county staff and program goals. The NY EDEN network does provide a mechanism for real-time disaster impact data to be captured and assimilated across the state through the Cooperative Extension network. The potential for broader impact seems to be available, but will take a more concerted effort by NY EDEN and Extension to reach out to the EMC of each county. A recommendation for NY EDEN is to establish a network connection to county EMCs either through local Cooperative Extension offices or in a more direct means where necessary. NY EDEN has the experience and focus on emergency preparedness at the citizen level that is currently a weak point for counties as noted by this study and the state Office of Emergency Preparedness (Office of Emergency Preparedness, personal communication, September 2017). A coordinated effort would benefit both organizations and strengthen community preparedness across New York State.

If we consider the small pool of county residents and their responses to the interview questions, all felt their counties were reasonably well prepared for emergencies. They were not

aware of NY EDEN; however, the CART program was familiar to them. Each individual did have key community players that would be helpful in communicating needs of the community in an emergency. The Soil and Water Conservation Service and Cooperative Extension, along with Farm Bureau were highlighted. The identified community members were not always on the LEPC, but were typically active in local government and there was a perception that they could tap into the network in case of an emergency. The current research data aligns with findings in Perry and Partridge (2014) where the focus groups agreed there was a substantial network of supporting communication between state and local level organizations, yet cell phone coverage and internet coverage continued to be inconsistent and a major concern for residents in regard to emergency notification. Literature argues in favor of a strong community network in rural areas as well. Kapucu, Hawkins & Rivera (2013) build a case that rural communities are often at the periphery of large emergency response efforts and get pushed aside as the urban areas are dealt with. If rural communities have collaborative ties such as those discussed in this study and the literature, the community organizations and agencies can enter into the post-disaster recovery phase much faster. The Kapucu, Hawkins & Rivera (2013) article focuses on central Florida, a large, rural agricultural expanse that aligns with many areas of upstate New York as well. The communities often lack financial resources and training, although, the volunteer fire departments in New York have had substantial grant funding and training to help provide expertise in times of disaster.

Discussion of State and Federal Level Implications

New York appears to be ahead of states reporting in the 2008 LEPC National Survey in regards to community participation and frequency of meetings. Whitney and Lindell's (2000) research aligns with the national survey finding minimal LEPC activity across five states concerning activities related to community hazard management. Two thirds of counties failed to submit required documentation in Michigan while NY CEPA data shows almost complete compliance in Tier II (federally mandated potential hazards) hazardous material reporting and all counties complied with the County Emergency Preparedness Assessment (CEPA) process. Interview discussions noted a clear understanding of the Tier II reporting requirements and all counties took this very seriously. This may stem from clear state-level guidance via emergency management within Homeland Security. The CEPA patterns and interview data imply state-level influence but it is not specifically stipulated beyond contact with state emergency staff. The Sara Title II legislation is federal legislation that all states must comply with and it appears that New York has clearly embraced that challenge.

State and national-level perspectives align with the three storylines found by Aldunce et al., (2014) in regards to disaster resilience. First a sizeable response group in their Australian study relied on the mechanistic/technocratic perspective of controlling the environment and engineering solutions to minimize the impact of disasters. This structure utilizes a strong command and control culture with governmental influence and constraints on community interactions. Agency and public organizations are active via the LEPC or similar structures in New York with only 25% of counties using contracted services in CEMP development. Nationally the LEPC engagement in emergency plan development is at 50%. The pattern in New

York is an increase in contractual use and a decrease in the community engagement, a turn towards the mechanistic/technocratic approach. This may well stem from budgetary issues and priorities within the National Homeland Security system where the emergency preparedness funding resides.

Second, the largest response was in the community-based perspective of disaster risk management. The central focus of this storyline was to achieve resilience within communities by enhanced social capital. The communities pull together, prepare and plan for disasters and depend less on state and federal responses for aid and solutions. Clarke and Chenoweth (2006) provide additional support through their study that finds public and private collaborative decisions propel implementation of policies and reduce vulnerabilities. Relating that to state and national LEPC trends, 90% of counties reporting have established protocols for informing the public in emergencies. In this New York study the percentage was 100% for notification with the limitation that 25% of rural areas lack easy access to the warning systems. Further engagement of the public was lacking outside of the LEPC.

The third storyline that emerged in the Aldunce et al. (2014) study was sustainability. A more organic or holistic approach to working with natural disasters and the biological forces impacting human culture was presented. This was the smallest group in their study, but the concepts brought forth relate to current challenges and discussions relevant to emergency planning. The central theme of not trying to control natural elements, but learning to respect and embrace the “ebb and flow” of the natural environment and human interactions works to encourage accepting the unpredictability and being prepared to adapt to the outcomes

associated. Interview responses suggested that this is a challenging perspective for communities and EMCs to adopt. It also requires planning and possibly limitations in land use that are problematic to some sectors of community development. In the New York data, the third standpoint can be observed when recovery/mitigation was initiated in communities that have recently had a severe weather event occur. The tension between immediate repairs as compared to a more thoughtful redesign to adapt for future events occurs each time a community needs to rebuild after an event. The recent flooding in Houston due to Hurricane Harvey had been predicted. Rapid, unregulated growth, aging infrastructure and a flat landscape coincide to create a situation in which flooding will occur. The community needs to begin addressing the issue and finding solutions to retain rainwater in designated areas. Potential solutions were available years ago, but political and budgetary constraints hindered implementation (Schaper, 2017).

One strength in emergency response that was observed in the current study interviews and state-level data is in firefighting and support operations. Local fire departments, often volunteer based, were consistently held in high regard as a key component to emergency preparedness plan implementation. The national LEPC survey did not address this particular focal point. EMCs from multiple counties noted that federal and state grants have been directed to fire agencies in support of specialized equipment and training to assist in the readiness of all fire agencies. Clarke and Chenoweth (2006) found a trend for decreased funding for "all hazards and first responders" and a move to targeted funds for specialized risk factors as national homeland security continues to refine targets for funding opportunities. Targeted federal funds may severely limit the 90% volunteer fire fighting force in New York

State to respond to general disasters due to general budget shortfalls. (https://apps.usfa.fema.gov/registry/summary). Current volunteer fire departments are facing a shortage of manpower, further decreasing their ability to respond as needed. Shifts in funding and decreasing interest by younger generations will decrease the level of preparedness.

Political implications regarding vulnerability assessment and narrowly focused implementation were increasing at the federal level at the time of the study as noted specifically by EMCs when discussing LEPC funding. This impacted New York as a change in LEPC funding to a more targeted hazardous materials focus has forced several LEPC groups to shrink in size and impact or force a shift to local funding resources. The shift to local funding sources was noted in counties with active LEPCs. The lack of state funding was a reason stated by counties that did not have an active committee or one that only focuses on hazardous materials.

The data of this study align with emerging trends in state and national LEPC data. While the overall planning in county CEMP's could be classified as well-prepared, there are challenges that surface based on results from this study and state-level discussions. County planning for emergencies is strong across the state in CEPA data, however, 25% of the counties in this study used contracted services to update the plans. The larger question is one of implementation, regardless of the development process. The plans are developed, but not all counties actively use them in table-top exercises (practice events for the county) or update the operational measures with new county organization leadership. The statewide shift to more contracted

development starts to move the activity into a “check the box” effort without a clear plan for implementation. The second area noted in state-data is weakness in public notification and warnings. The current study found strong notification systems in place for the general public, but in a broadband form (cell phone texts and emergency broadcasts). The state-data finds a weakness in notifying vulnerable populations, those that have limited access to technology. The current study did not consider the stratification of community member access to information, an area deserving future study. This concern also surfaces when reviewing the national LEPC survey data. Less than 50% of counties had general public involvement in the LEPC. 90% of counties did have protocols for informing the public, but 59% listed newspapers as their notification method. An effort to broaden contact methods and better track who receives the information would be helpful in strengthening public awareness and safety. State data also display an issue with citizen awareness and preparedness. The lack of awareness by EMC’s and community members of NY EDEN is an indicator of this trend. Greater utilization of NY EDEN is a promising means of improving citizen awareness and preparedness. LEPCs work with EMCs to generate citizen preparedness programs, but the reality of today’s communities is that individuals are not well connected to common community groups. Countywide programs serve participants that self-select to participate. This leaves many individuals without needed information. Further research and program development are needed in this arena to encourage better preparedness by all citizens. The one time this is not an issue is following a recent disaster event. At that point, community members become very aware of what did not go well in preparation and recovery such that an active discussion can occur. One area that was clearly noted is in the counties across Northern NY. The last major weather event was the ice

storm of 1998 and representatives still refer to that event as the touchstone that changed everyone's perspective of emergency planning. A similar situation unfolded when talking with a county that had experienced severe flooding a few years ago. The community was not an active participant in planning and implantation efforts across the county; however mindsets have shifted, for the short term and mechanisms to increase community resistance are underway. The impact of these disasters on neighboring communities and their interest in emergency planning is unclear and could certainly be an area for further study.

In summary of state and national perspectives, the last national survey of LEPC was in 2008 which demonstrates a limited interest in continuing to build upon trends and capacity embodied by the LEPC structure at the national level. This capacity has largely been returned to state control. New York State has embraced the LEPC and importance of emergency preparedness as evidenced by the CEPA analysis tool and continued expectation that each county has a well-defined CEMP and resources for implementation. Based on the CEPA data and results of the current interviews, weakness in some counties causes concern for overall strength. The one area of most concern is citizen awareness and preparedness as both state and interview responses displayed a lack of effective programming in this area. EMCs gravitate towards a mechanistic/technocratic range of management and implementation tools. Community interaction is present through organizations but public involvement and awareness are lacking. From this review of state and national considerations we can move to our underlying conceptual model of resilience.

The model presented by Norris et al. (Figure 1) pg. 15, starts with a balance between a stressor and resources available. A crisis occurs only when the resources fall out of balance with the stressor such that adaptive capacity of a community of individual is inadequate. Transient dysfunction is the state of unknown the system is in until the community adapts to new situation caused by the event, and the system develops a new position of balance between stressor and resources, or the entity continues is a state of vulnerability and lack of balance.

The results as noted in Chapter Four and discussed in the analysis above point to the LEPC as being an important element in many county emergency planning procedures to aid in community-wide development of three properties put forth by Norris: robustness, redundancy, and rapidity. Yet the LEPCs position is found to be one of advising more than interacting as a conduit for action. The EMC is a more consistent conduit for direct action by both the government-related agencies and the local NGOs that are attuned to emergency planning and have an active role to play. The LEPC helps to inform the EMC of issues and perspectives of its member organizations, however, the scope of the LEPC is quite variable from county to county due to the guidance that is provided by the EMC. This variability weakens its use as a dissemination tool as depicted in the Norris model. The LEPC takes more of a position as an advisory role to the EMC which is still an important and helpful task, but not as directly critical to success. Through this research, clarity has been added regarding the resource mobilization elements of the original model. The EMC is the point person for connecting the resource providers and orchestrating implementation of both physical resources and staff. This was evident across all counties interviewed, and is supported by state-level data. A critical point is the ability of the EMC to foster strong networks and be proactive in their approach to new

threats to communities. The ability to adapt to new threats with a deeper network appears to strengthen county CEMPs and with practiced implementation, increase community resilience. The management style of the EMCs and networking interest will drive the success of the community resources to balance known and unknown stressors or initiate adaptive capacity to secure new resources such that resilience is demonstrated and a post-event environment is established that favors a balance of resources again. The model presented by Norris aligns with the storylines put forth by Aldunce et al. (2014) as well. The technocratic standpoint surfaces when discussing the propensity of EMCs to have a command and control approach, yet, the overall model embraces a community-based structure where a broad array of resources is available and networked to the EMC. The sustainability standpoint is visible in the model where a community is at a stable position prior to a weather event causing stress, the community applies resources and a plan to react to the stressor with the goal of finding a balance point again. Realizing that the new balance point is not likely the same as before the event. A related passage in Fra.Paleo (2016) notes that social relationships are the driver of recovery. The LEPC, or analogous organizations, (SALT or CHIT), offer a conduit for social relationships to become established at the county level with the intent of increasing the capacity for recovery from an event. However, in counties across upstate New York, it is the emergency management coordinator that is the networking agent that facilitates communication and coordination across all groups.

The model presented by Norris has been modified through the current study as presented in (Figure 10). The addition suggested for the Norris model includes the EMC and LEPC specifically as vehicles for a community network focused on emergency planning. This

modification, which builds upon the study results, operates with categories of network intersections rather than unique individuals or groups. The variability in the extent of LEPC use and primary use as an advisory or sounding board encouraged the use of "community advisory committee" rather than LEPC exclusively. The current study found evidence of other forms of advisory roles being used such as partner organizations including government agencies, community organizations, business and private individuals all playing a part in the emergency planning network. Each group has unique needs and resources to bring into a discussion about emergency planning. NY EDEN was specifically identified as an organization committed to the education of private citizens and to emphasize the importance of NY EDEN in areas of weakness in county CEMPs. The arrow thickness and directional indicators are expected communication paths based on study results; however, they are estimates at best.

With an improved model of resilience in place, we can move to compare the current study to the Bowman and Parsons (2009) study upon which the project was modeled. The Bowman and Parsons study built upon extreme events as "focusing events" that produced policy change at national, state, and local levels. They specifically looked at five counties through case studies to consider three issues of interest: 1. Local governments will create performance regimes to address vulnerabilities, 2. Local governments will develop networks whose strength is inversely proportional to their local resource base, 3. Rural counties will develop more intercountry connections than urban counties. The same three issues guide the current study. The Bowman and Parsons study supported the idea that local performance regimes help local governments react to severe events. The current study did not use the term performance regimes and instead used the underlying issues of mobilizing community

organizations and agencies. This study narrowed the target to the EMC and LEPC as agents of change in county-level emergency planning. The two studies agree that key aspects of emergency planning impact the ability of a community to achieve resilience. Areas of agreement include: 1. Counties work at developing plans that meet the specific needs of their members, businesses and infrastructure as noted by the diversity of structures used by New York counties in this study. The coordination spans local, county and state levels with potential access to federal resources if needed. 2. A central hub of network development is critical to community planning and implementation. New York counties utilize the Emergency Management Coordinator (EMC) for this task. 3. Community organizations and businesses are prepared to step in when needed. They are connected, often via the LEPC, to the emergency network and are established as part of the response protocol. 4. Command and Control functions of emergency management are critical to the efficient implementation of plans in the event of a disaster. However, that same structure can be a contributing hindrance to private citizen responders. NY EDEN can aid in the development of prepared homes to decrease

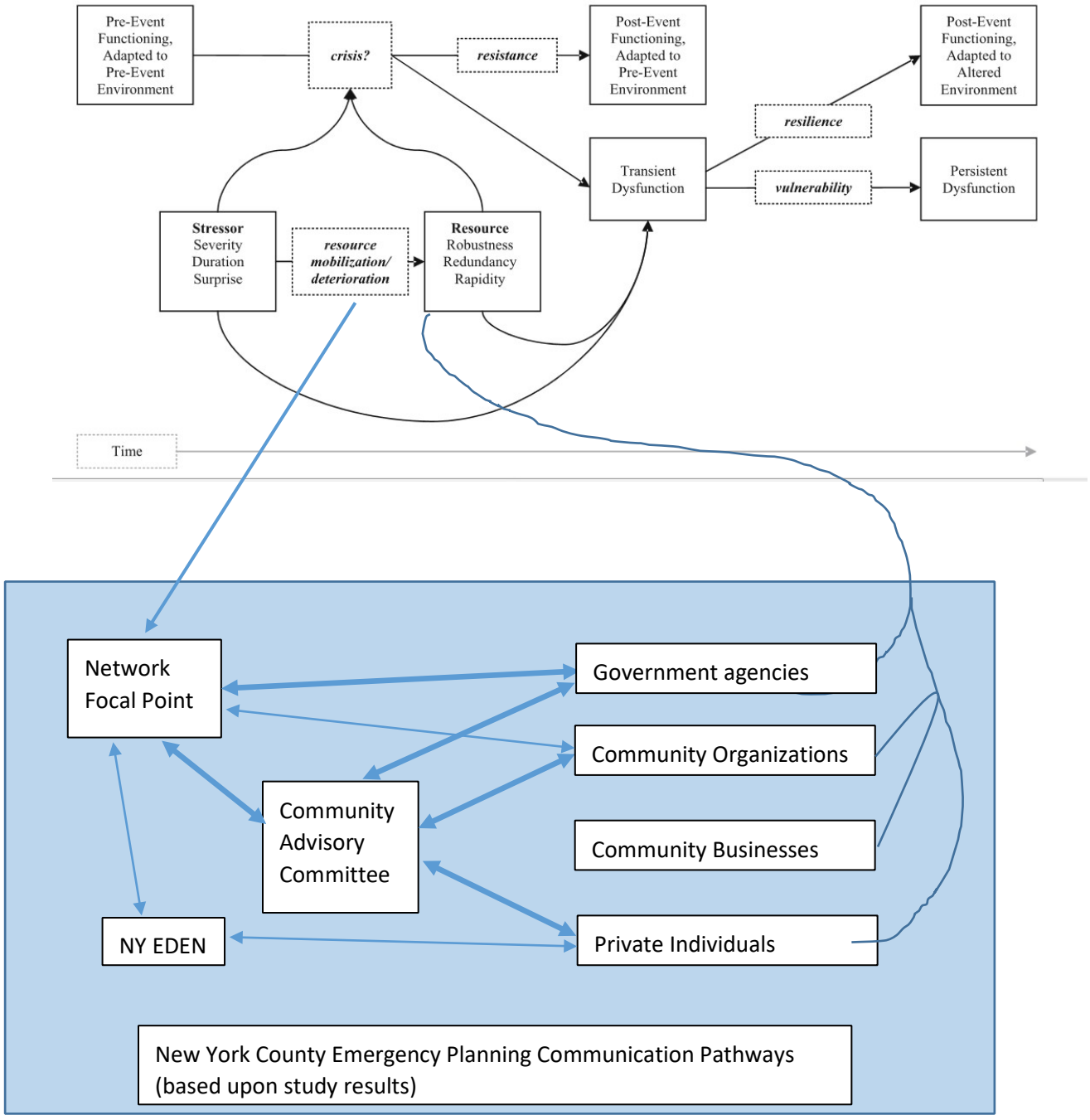


Figure 10. Modified Stress Resistance and Resilience Model based on Norris et al., 2008

demand for services and establish private citizen teams to provide depth of coverage if needed in a severe event, unfortunately this study found it to be an unknown and underutilized resource.

The second issue focused on resource capacity. The current study included local resources in the interview process as they are an element within the Norris model used to establish the study. Bowman and Parson found counties with plentiful resources to lack strong community ties including in emergency management. My study found resources incorporated were limited to county and state-controlled assets. Counties with limited assets allied with neighboring counties for support. The variation in community ties found by Bowman and Parson was not evident in the data from this study. Resource capacity based upon local, county, and state assets was deemed adequate and that perspective did not vary based on size of county. If private recovery assets were included, a different picture may emerge as we look from county to county, but again, the issue of using these resources including liability needs to be addressed. NY EDEN tools could aid in developing knowledge of private assets and assist in mobilization.

The third issue distinguished between rural and urban counties and the community connections in each. Bowman and Parson found a difference between urban and rural but it appears to be strongly confounded by the resource question. The urban counties were very well resourced in comparison with the rural counties. The current study included the rural and urban distinction as applied to LEPC use. Urban counties were just as likely to have active LEPC interactions. The only definitive distinction between rural and urban counties using the lenses stipulated in the current study was the frequency of meetings, and hence strength, of the

LEPC's. The impact this distinction has on effectiveness of response is not known, but could be the subject of further study. Rural counties did meet with more frequency, but all counties had very similar committee composition. One common element across both studies was the perspective that community involvement in emergency planning begins to wane if an extreme event becomes too much of a distant memory. The communities that have recent memory of the stressor becoming a crisis are generally more in tune with participating in emergency planning. The intent of this study was to provide a broader perspective on similar focusing questions to the Bowman and Parsons study. Including all counties as part of the target population support the identification of findings at a scale that allows for applicability across a broader range of states, at least along the eastern seaboard.

Summary of Recommendations

This research sought to discover what variations were evident in the LEPC structures across upstate New York. This made visible communication networks and an awareness of emergency planning for communities. The analysis of the results generated five recommendations that could potentially become action items at the state or county level.

1. Remove the mandate requiring an LEPC in New York and reframe it to recommend a strategy that can be adapted by any county.

The LEPC serves a networking purpose where used and is still involved in the hazardous materials planning process for a few counties. Without funding, the LEPC could be seen as a constraining structure that does not encourage effective development of a networking advisory committee as suggested in Figure 10. The state could remove or modify the LEPC mandate to

encourage creative development of community advisory committees that better fit the needs of each county.

2. Provide state and county level support for county EMCs to ensure a robust network of organizations and strategies to deal with disasters.

Emergency Management Coordinators are the key networking resource for counties. As the positon becomes more attractive to professionals in emergency management, the format and expectations may change. Maintaining state and county funding levels to support well-prepared and innovative people in the EMC position will serve to strengthen the future adaptability and relevance of county CEMPs as they must adapt to new population and environmental concerns.

3. Establish a format to encourage EMCs across the state to share ideas for programming to develop resident preparedness and awareness.

Resident awareness of emergency plans and preparedness in their own home was an area of concern across all counties. This is not placing blame entirely on the EMCs or the LEPC, but it does provide an area for further development state-wide. EMCs meet periodically at least across regions. Funding and research into successful avenues to engage citizens directly would be advantageous. Working in cooperation with NY EDEN (as noted in #5 below) may create a synergy and momentum to overcome the challenges that have limited effectiveness to this point and may make NY EDEN more successful in its work.

4. Maintain the current CART resources and invest in a state-wide producer awareness campaign that creates the ground-up knowledge base of what resources are available and where.

CART resource funding is currently static or non-existent at the state level. Counties support the resources currently on hand with small grants and budgetary expenditures. Awareness and training may be a more effective direction to move. If animal owners, both pet and commercial, were introduced to key elements needed in planning for working with animals in a disaster, and an awareness of current resources in each county, the county would benefit from trained responders on site to work animals and free up additional staff to aid human residents, if needed.

5. NY EDEN should establish a network connection to county EMCs either through local Cooperative Extension offices or in a more direct means where necessary.

NY EDEN has the experience and focus on emergency preparedness at the citizen level that is currently a weak point for counties as noted by this study and the state Office of Emergency Preparedness. Collaborating on efforts within counties or across counties in a regional format may better apply funds available to EMCs and provide a more active audience for EDEN expertise.

Future Research Suggestions

1. As an exploratory research project, this study calls attention to additional research topics that develop from the data analysis and discussion. NY EDEN is certainly positioned as an educational element for emergency preparedness as part of a national organization. A closer study regarding the opportunities NY EDEN provides and how counties can be reached more effectively would be worthwhile because currently this resource is either underutilized or not targeting community needs..

2. While the current average years in the job of emergency management coordinator was 7.4 years, many respondents had earlier careers in fire or emergency services. Based upon data reported by Terry Hastings (2014), a trend towards younger coordinators with college degrees in emergency management is developing. Research into how perspectives and networks change as coordinators enter the positon with less experience, yet more technical knowledge would be interesting to pursue, particularly the effect on responsiveness and resilience.
3. A final idea for related research is an in-depth qualitative study. The researcher could select a small number of counties and immerse him/herself in the interactions and narratives that intersect at the emergency management coordinator position since this was identified as the key position in terms of making counties resistant, resilient, and having an effective communication plan. This study focused on the LEPC as a nucleus for those networks. While it is a tool for use, it is not the primary source of the networks used in planning and implementation. Much of that may stem from the personal relationships of the EMC. A series of case studies to shed a brighter light on the EMC role would further define aspects suggested within this current study.

How Current Study Informs Community Emergency Planning

The research embarked upon in this dissertation was exploratory in nature. Rural communities and urban communities might like to consider themselves different from each other in terms of preparing for an emergency. How can one expansive county with few people in it understand the needs of a densely packed urban area with cars, pets, and people galore?

The two groups might not relate to each other well; however, in terms of emergency planning mechanisms, both types of communities have emergency management coordinators that are experienced in fire or safety and are able to establish networks of agencies and organizations to step in and support the community when disaster strikes. The supposed differences did not hold up under scrutiny through the lens of the EMCs. Each county maintains a well-connected network of organizations and agencies from the local, county and state levels. There are implications that state directed mandates, both funded and non-funded, have had an impact on creating a baseline of preparedness in the upstate counties interviewed.

Prior research does highlight a weakness in access to information due to gaps in infrastructure. The current study finds that communication to individual community members is quite cursory and lacks an emphasis on pre-planning. The warnings are more reactive in nature. Gaps exist in the warning systems as well with elderly and at-risk populations not as likely to have heard the information issued by EMCs. Solutions to improve the overall communication network are a subject for later study.

This study was able to capture perspectives from the county EMCs and compare the trends that emerged with trends observed at the state level. The comparison of local to state-level data is an improvement upon data collected in the Bowman and Parsons (2009) study that helped develop the current inquiry. The model presented by Norris et al., (2008) with the proposed addition was determined to need refining following data collection. The LEPC, while an important tool in networking for the EMCs, did not act as substantial a conduit as projected in the initial study development. The knowledge and networking ability of the Emergency Management Coordinator is the keystone of a strong county emergency plan and response.

The increasing professionalism exhibited in the EMC position as noted by Hastings (2017) lends itself to stronger networks with continued development of vertically integrated elements that allow for faster communication and response from the local level up to the state, and subsequently, the national organizational levels. If emergency systems continue to develop, the national-level network suggested by Wise (2007) may emerge into a successful system that can quickly respond to a disaster, and all levels of resources and expertise can be put into place efficiently to minimize recover time for the community.

Summary Statement

The concept of resilience will continue to inspire research as it continues to present multiple approaches that can be supported or refuted within the scientific community. This study brought to light nuances at the county level of one state that demonstrated the diversity of response that communities feel are successful in their efforts to provide resources to balance the stressors that occur in our neighborhoods.

Emergency planning at the citizen level through avenues including the LEPC and NY EDEN have room for improvement and would benefit from state funding in support of such activities. The CEMP might well become more effective if citizens were aware and prepared to mobilize according to the plans developed. The counties of upstate New York demonstrate a strong belief in self-reliance through organized emergency response planning including community organizations in most circumstances. There are areas of growth in citizen awareness and planning along with public information and warning, especially in at-risk populations. As a state

system, New York is ahead of the national trend in state level organization and implementation of measures to support local planning, response, and recovery.

References

Adler, P. (2001). Market, Hierarchy and Trust: The Knowledge Economy and the Future of Capitalism. *Organization Science*. Vol. 12, No.2, p. 215-234.

Agranoff, R. & McGuire, M. (2001). Big Questions for Public Network Management Research. *Journal of Public Management Research and Theory*. Vol.11, No. 3, p. 295-327.

Aldunce, P., Beilin, R., Handmer, J., Howden, M. (2014). Framing disaster resilience: The implications of the diverse conceptualizations of "bouncing back". Disaster Prevention and Management. Vol. 23, No.3, p. 252-270.

Arnold, D.S., Becker, C.S., Kellar, E.K.,(1983). Effective Communication: Getting the Message Across. International City Management Association, Washington, D.C..

Baker, M. (n.d.). The Decade's Worst Hurricanes. Retrieved from www.coastalliving.com/lifestyle/worst-us-hurricanes

Berkes, F., (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* V. 90 p.p. 1692- 1702.

Bilham, R., (2010) Lessons from the Haiti earthquake. Nature 463, 878-879 (18 February 2010). http://www.nature.com.proxy.library.cornell.edu/nature/journal/v463/n7283/full/463878a.html

Bourdieu, P., (1986). The forms of social capital. In Handbook of theory and research for the sociology of education, ed J.G. Richardson. New York: Greenwood.

Bowman, A. and Parsons, B. (2009). Vulnerability and resilience in local government: Assessing the strength of performance regimes. State and Local Government Review. Vol. 41 No.1, p. 13-24.

Bucci, S. et al. (2017). After Hurricane Sandy: Time to learn and implement the lessons in preparedness, response, and resilience. Special Report No. 144, October 25, 2013. The Heritage Foundation, Washington, DC. Heritage.org.

Organizational Model. (n.d.) In *Cambridge Dictionary on-line*. Retrieved from https://dictionary.cambridge.org/dictionary/english/organizational-model

Carpenter, S., Walker, B., Anderies, M., Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, 4, 765-781.

Clark, S.E. and Chenoweth, E. (2007). The politics of vulnerability: Constructing local performance regimes for homeland security. Review of Policy Research. Vol. 23 No. 1. P. 95-114.

Coleman, J.S., (1988). Social capital in the creation of human capital. *American Journal of Sociology*, V94. S95 – S120.

Cutter, S.L., Emrich, C.T., Mitchell, J.T., Boruff, B.J., Gall, M., Schmidtlein, M.C.,Burton, C.G., Melton,G., (2006) The Long Road Home: Race, Class, and Recovery from Hurricane Katrina. Environment:Science and Policy for Sustainable Development, 48:2, 8-20. Retrieved from: http://dx.doi.org/10.3200/ENVT.48.2.8-20

Cutter, S.L., Burton, C.G., Emrich, C.T. (2010). Disaster resilience indicators for benchmarking baseline conditions. Journal of Homeland Security and Emergency Management, 7 (1) 1-21.

Djalante, R. and Thomalla, F. (2011). Community Resilience to Natural Hazards and Climate Change: A Review of Definitions and Operational Frameworks. Asian Journal of Environment and Disaster Management, Vol. 3, No. 3 (2011) 339-355.

Emergency Planning Guide for Community Officials. (2008). Joint project by the New York State Emergency Management Office and the New York State Emergency Management Association.

http://eden.cce.cornell.edu/AboutNYEDEN/Pages/default.aspx

Evans, B., & O'Brien, M. (2015). Local Governance and Soft Infrastructure for Sustainability and Resilience. In Fra.Paleo (Eds), Risk Governance (pp. 77-98), New York, NY: Springer.

FEMA (2004) Responding to Incidents of National Consequence. FA-282-May 2004. United States Fire Administration, Federal Emergency Management Agency. Contract EME-98-CO-0202 T018.

FEMA (n.d.). Disaster Declarations by State/Tribal Government. Retrieved from https://www.fema.gov/disasters/state-tribal-government

Flynn, S. (2007) The Edge of Disaster. Random House, NY.

Gasparini, P., Manfredi, G. & Asprone, D. editors, (2014). *Resilience and Sustainability in Relation to Natural Disasters: A Challenge for Future Cities*. Springer, New York.

Geis, D.E., (2000). By Design: The Disaster Resistant and Quality-of-Life Community. Natural Hazards Review, Vol. 1, No. 3., pp. 151-160.

Gharajedaghi, Jamshid. (2011). *Systems Thinking*. Morgan Kaufmann. Retrieved 8 September 2017, from <http://www.myilibrary.com?ID=315258>

Gimenez, R., Gimenez, T. & May, K., (2008). Technical large animal emergency rescue. 1st edition. Wiley-Blackwell, Ames, Iowa.

Gladwell, M., (2002). The Tipping Point. Little, Brown and Company, New York, NY.

Gleick, J., (1987). Chaos, Making a New Science. Viking Penguin, New York, NY.

Guba, E.G. & Lincoln, Y.S., (1989). Fourth Generation Evaluation. Sage Publications, Newbury Park, CA.

Gunderson, L.H. (2000). Ecological resiliency – in theory and application. *Annual Review of Ecological System*, 31:425-39.

Gunderson, L.H. & Holling, C.S., (2002). Panarchy, understanding transformations in human and natural systems. Island Press, Washington, D.C..

Hastings, T. (2017) Next Generation Emergency Management. http://www.domesticpreparedness.com/preparedness/next-generation-emergency-management/

Hurricane Sandy Fast Facts. (2017, October, 19). CNN Library. Retrieved from www.cnn.com/2013/07/13/world/americas/hurricane-sandy-fast-facts/index.html

Jennings, B., Arras, J.D., Barrett, D.H., Ellis, B.A., (2016). Emergency Ethics: public health preparedness and response. Oxford University Press, New York, NY.

Kahan, Jerome H.; Allen, Andrew C.; and George, Justin K. (2009) "An Operational Framework for Resilience," *Journal of Homeland Security and Emergency Management*: Vol. 6: Iss. 1, Article 83.

Kapucu, N., Hawkins, C.V., & Rivera, F.I., (2013). Disaster Preparedness and Resilience for Rural Communities. Risk, Hazards & Crisis in Public Policy, Vol. 4, No. 4, pp. 215-233.

Kulig, J.C., Edge, D.S., Townshend, I., Lightfoot, N., Reimer, W. (2013). Community resiliency: Emerging theoretical insights. *Journal of Community Psychology*, 41 (60 758-775.

Kotler, P. and Zaltman G., 1971. Social Marketing: An Approach to planned social change. Journal of Marketing, 35: 3-12.

Lee, N.R. and Kotler, P., 2011. Social Marketing: Influencing behaviors for good. 4th ed. Thousand Oaks, CA: Sage.

Lefebvre, R.C. 2013. Social marketing and social change: Strategies and tools for health, well-being, and the environment. San Francisco, CA: Jossey-Bass.

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*. Sage, Thousand Oaks.

Lindlof, T. R. & Taylor, B.C., (2002). Qualitative Communication Research Methods. Sage Publications, Thousand Oaks, CA.

Local Emergency Planning Committee Guide. (2014). Nebraska Emergency Management Agency, Nebraska State Emergency Response Commission and the University of Nebraska Public Policy Center. Lincoln, NE.

Longstaff, P.H. (2005). Security, resilience, and communication in unpredictable environments such as terrorism, natural disasters and complex technology.

Lucini, B., (2016). Disaster Resilience from a Sociological Perspective. Springer, New York, NY.

Manyena, S.B., (2006). The concept of resilience revisited. Disasters, 2006, Vol 30. No. 4. Pg 433-450. Blackwell Publishing, Oxford.

McManus, P., Walmsley, J., Argent, N., Baum, S., Bourke, L., Martin, J., Pritchard, B., Sorensen, T., (2012). Rural Community and Rural Resilience: What is important to farmers in keeping their country towns alive? Journal of Rural Studies. Vol. 28. Pg. 20-29.

Meyer-Emerick, N., 2016. Using Social Marketing for Public Emergency preparedness. Routledge, NY.

Moon, I., Carley, K.M., Kim, T.G., (2013). Modeling and Simulating Command and Control: for organizations under extreme situations. Springer. Books24x7 *http://common.books24x7.com.proxy.library.cornell.edu/toc.aspx?bookid=76641*

National Academy of Sciences. (2012). *Disaster resilience: A national imperative*. Washington DC: National Academies.

Nationwide Survey of LEPCs. (2008). Office of Emergency Management of the U.S. Environmental Protection Agency.

New York State Department of Health. (2006). Table 2: Population, Land Area and Population Density by County, New York State. Retrieved from https://www.health.ny.gov/statistics/vital_statistics/2006/table02.htm

New York State Executive Law Article 2-B. (1978). Retrieved from http://www.dhses.ny.gov/laws-policies/documents/Exec-Law-Art-2-B-2013.pdf

NYS Homeland Security, personal communication, January 20, 2015).

NOAA. Is sea level rising? National Ocean Service website, https://oceanservice.noaa.gov/facts/sealevel.html. 10/10/2017

Norris, F. H., Stevens, S.P., Pfefferbaum,B., Wyche, K.F., Pfefferbaum, R.L. (2008). Community resilience as a metaphor, theory, set of capabilities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127-150.

Ormerod, P., (1998). Butterfly Economics. Pantheon Books, New York, NY.

Patton, M.Q. (2002). *Qualitative Research & Evaluation Methods*. 3rd edition, Sage, Thousand Oaks, CA.

Paton, D. and McClure, J., 2013. Preparing for disaster: Building household and community capacity. Springfield, IL: Charles C. Thomas.

Perry, J. & Partridge, T. (2015) New York Agriculture Resiliency Growth Project: Summary Report. Unpublished manuscript, Department of Horticulture, Cornell University, Ithaca, New York.

Pignataro, T.J. (2016, December 16). By the numbers: WNYs post-storm winter weather boxscore. The Buffalo News. Retrieved from http://buffalonews.com/2016/12/16/winter-numbers-buffalo/

Ranke, U. (2016). *Natural Disaster Risk Management*. Springer, Switzerland.

Responding to Incidents of National Consequence. (2004). FA-282-May. FEMA.

www.saltdevelopment.org

SAS Institute, (2012). JMP Version 12. SAS Institute, Cary, NC.

Schaper, D. (2017). Three Reasons Houston was a "Sitting Duck" for Harvey Flooding. NPR August 31, 2017. http://www.npr.org/2017/08/31/547575113/three-reasons-houston-was-a-sitting-duck-for-harvey-flooding

Stambaugh, H & Sensing, D. (2008). Special Report: Fire Department Preparedness for Extreme Weather Emergencies and Natural Disasters. United States Fire Administration. http://www.usfa.dhs.gov.Timmerman, P. (1981). *Vulnerability, Resilience and the Collapse of Society*. Institute for Environmental Studies. Toronto, Canada.

U.S. Fire Administration (2016). Field Operations Guide. ICS 420-1, June 2016. National Fire Academy, FEMA.

Weather Disaster declarations (n.d.) FEMA, retrieved from https://www.fema.gov/states/new-york

What is a disaster? (n.d.). International Federation of Red Cross and Red Crescent Societies. Retrieved from http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/

Whitney, D.J. and Lindell M.K. (2000) Member Commitment and Participation in Local Emergency Planning Committees. Policy Studies Journal, Vol. 28, No. 3 pg 467-484.

Wise, C.R. (2006) Organizing homeland security after Katrina: Is adoptive management what is missing? *Public Administration Review*, 66, 302-18.

Wisner, B., Blaikie, P., Cannon, T., Davis, I., (2004). At Risk. Second Edition, Routledge, London.

Zakour, M.J., and Gillespie, D.F., (2013). *Community Disaster Vulnerability*. Springer, New York.

Zobel, C.W., (2011). Representing perceived tradeoffs in defining disaster resilience. Decision Support Systems. Vol. 50, pp. 394-403. www.elseviar.com/locate/dss.

Zobel, C., & Khansa, L. (2014). Characterizing multi-event disaster resilience. Computers and Operations Research Vol. 42 pp. 83-94.

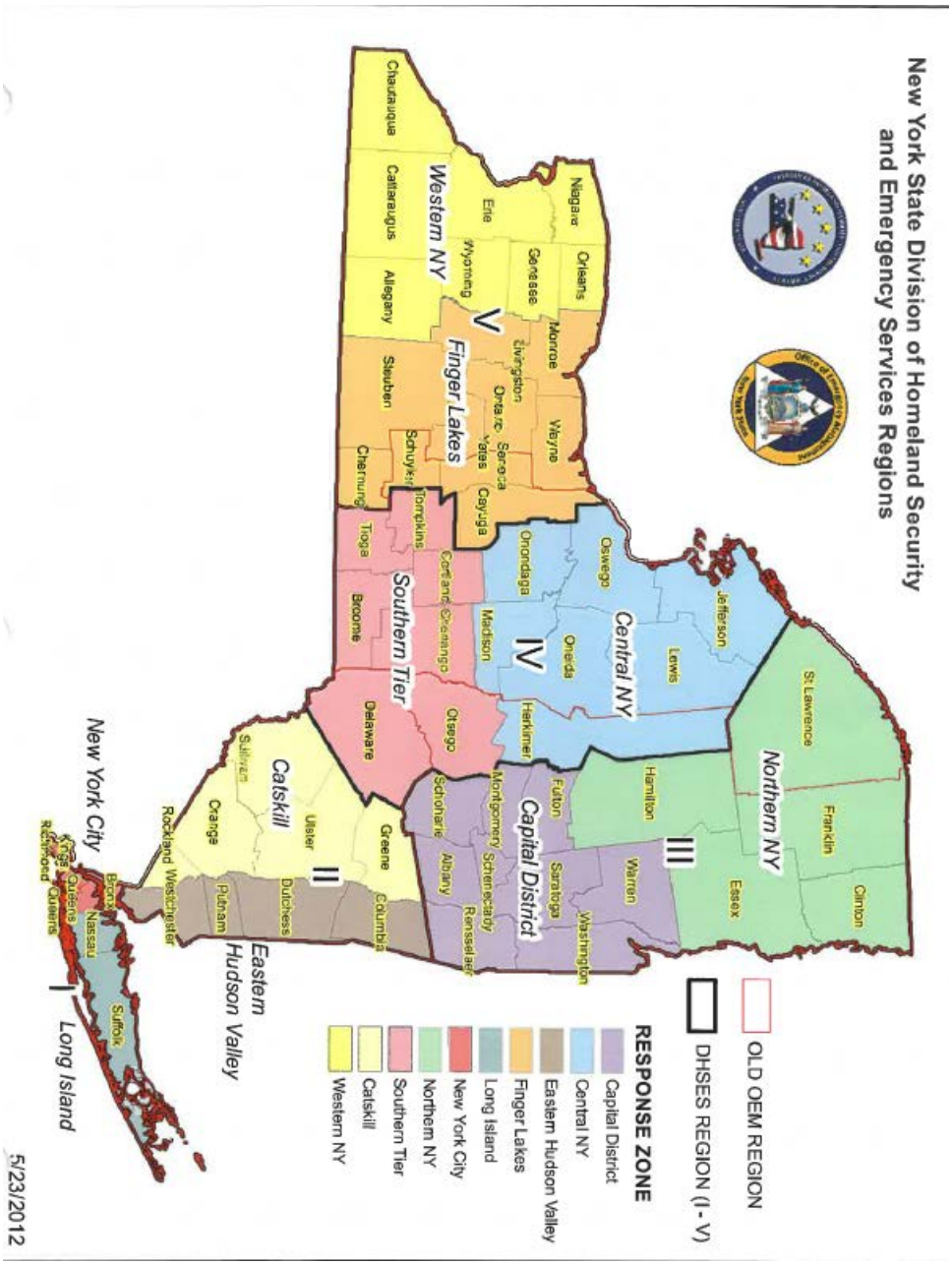


Figure 11: New York State Division of Homeland Security and Emergency Services Regions

Jeff Perry

Communication Pathways Impact on Disaster Resilience

Interview with the emergency planning and response coordinator for the county:

1. Number of years in position?
   N = 24 Max 22; Min 1.5 mean 7.4 median 6 SD 5.8

2. Full or part time position?

   N = 24 100% full time coordinator position

3. How many staff FTE's are working in emergency planning areas?

   N = 24 Max 6; Min 1 mean 2.45 median 2 SD 1.4

4. Is there a county command center available?
   N = 24 100%

5. What agencies do you have direct, real time contact with during an emergency response, beyond fire and police?
   See:

   Table 1: Primary contact by EMO in Emergency Responses

   Figure 5: Primary contact by EMO in Emergency Responses

6. Do you have an active LEPC and how often does it meet?
   N = 24
   3 counties 0 = none

   7 counties 1 = annually or biannually

   5 counties 2 = quarterly

   6 counties 3 = bi-monthly

   4 counties 4 = quarterly

   Any similarity from rural/urban or age of coordinator/ etc? ???

7. How many individual organizations are represented on the LEPC or do you work with on a regular basis?

   N = 24 max 120, min 0; mean 22.125 and median of 17.5 SD 24.3

8. Is participation by the various agencies consistent? Yes or No

The next three questions relate to communication pathways in emergency planning. Several will use a scaled response with 1 equaling no involvement; 2 involvement limited to advisory role; 3 active review of plans; 4 being involved in refining the plan; 5 working on the plan from its initial development level

9. What level of involvement does the LEPC have in the development of the local emergency plans?

   N = 24

   1 counties 0 – alternate format for LEPC involvement

   6 counties 1 – contracted with professional for development

   8 counties 2 -- full function review and plan development

   9 counties 3 – narrow use of LEPC related to Haz Mat efforts

10. Can you provide an example of how your LEPC works to aid in the development of the county emergency plan?

11. Are community partners involved in hazard assessment process?

    N = 24

    8 counties low level of involvement in hazard assessment

    5 counties medium level of involvement – reviewed plan

    11 counties high level of involvement – developed and reviewed plans as part of larger team.

    11A. Could you provide an example?

12. Does the county response capacity include resources beyond local, county, and state agency resources?

    N = 24

    13 counties no level of response capacity planned beyond local, county, state agency resources.

    3 counties maintain a moderate level of capacity between MOU's

    7 counties Use the LEPC to connect with local resources

    1 county relies on fire units for resources access

13. Are external organizations involved in developing the county response capacity?

    13A. Can you provide an example?

14. Who directs the yearly program of work for the county LEPC?

    N = 24
    Chairman of committee develops POA in 6 counties
    Emergency Manager develops POA is 13 counties
    A joint project between EMC and Chair in 5 counties.

15. What is your perceived level of commitment by the organizations involved in putting the LEPC to work to better county emergency planning?

    N = 24
    6 counties low commitment
    8 counties moderate commitment
    10 counties strong commitment

16. What do you feel most impacts the success and engagement of the county emergency plan implementation?
    N = 24
    5 counties training elements
    2 counties internal communication and understanding
    17 counties relationships developed with community members

The next range of questions is interested in the incorporation of emergency procedures and efforts for community businesses beyond the typical personal safety issues.

17. How does the county respond to spill or containment issues? (could simply ask if they have a business contact list)

18. Does the county have a County Animal Response Team (CART) or other animal response process for emergency situations?
    N = 24
    7 counties do not have an active CART
    5 counties have LEPC's on paper only
    2 counties with active MOU's for CART services
    7 counties have active CART plans and equipment

19A. Is the CART an integral component of the county emergency plan?

19. Is the county emergency coordinator and/or LEPC aware of emergency preparedness plans developed by local businesses?
    N = 24
    5 counties Minimal awareness 1
    13 counties moderate awareness – major businesses 2
    6 counties very aware and active – small and large businesses 3

20A. To what extent are the business emergency plans developed? 1 minimally; 2 reviewed annually; 3 annually updated and practiced

20. Are there specific resource and inventory lists from local businesses and organizations available to the emergency coordinators and LEPC?
    N = 24

No resources inventories	9 counties
Minimal resources	6 counties
Yes lists available	9 counties

21. Are you familiar with NY EDEN and if so, how does it fit into the county emergency plan?

    N = 24

    16 county emergency planners were not familiar with NY EDEN

    8 county emergency planners had heard of NY EDEN – only one actively involved with them.

22. Do county emergency plans include local resources as an aspect of implementation in the case of a severe weather event? If so, how? Are they noted in the plan or is it simply assumed they will respond if needed?

Jeff Perry

Communication Pathways Impact on Disaster Resilience

Interview questions for county resident in regards to their perspective of the emergency planning and response activities for their county:

1. Number of years living in the county?

2. Is the Emergency Coordinator a Full or part time position?

3. Are you familiar with the Local Emergency Planning committee or other organized mechanism for the Emergency Coordinator to interact with community members? If so, can you describe the communication pathways available?

4. Who would you describe as key players in the agricultural or industry sectors in terms of communicating needs or responses outside of fire, police, Red Cross and health agencies?

5. What level of preparedness would you apply to your county agencies**? Very prepared, reasonably prepared, somewhat prepared, poorly prepared** for:
    i. Severe weather

    ii. Hazardous spills

6. Are you aware of any agriculture or commercial businesses that have their own emergency plans?

7. Does your county have a County Animal Response Team available?

8. Are you familiar with NY EDEN and if so, how does it fit into the county emergency plan?

9. How would you describe the communication across emergency services from local towns to the county and up to the state level? Strong, moderate or inconsistent?